COAL AGE

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Commissary Buying

Do you run a commissary or several of them as a necessity in connection with your mining operations?

WE say "as a necessity" because the best managers are learning that it does not pay in the long run to place the profits from the company store ahead of those derived from the main business of mining and selling coal.

But the commissary is a necessity in localities remote from towns in order to provide a place of trade for the mining community. Also many companies are forced to continue the policy of conducting company stores where the mining operations are in proximity to towns and cities. The reason for this is found in the fact that the average merchant has not yet learned the Golden Rule and persists in charging too much for life's necessities and then issuing garnishments to get it.

So the company store is still an institution of the mining industry. However, it is being conducted by every wise executive as a help to the employees and their families rather than as a money-maker for the company. The latter policy will not pay in the end; and we say it with pride that a goodly list of companies, large and small, could be noted here whose policy in the operation of commissaries is to make them purely self-sustaining community stores, furnishing the very best goods at prices that are right and fair to all. The conduct of such stores is a credit to the companies owning them.

But this kind of company store, much more than those that are operated only for profit, requires *real management.* Good business sense is essential to conduct a store in which the chief consideration is not to make money, but which still must in no sense savor of paternalism. At the same time the element of cost must be considered, and sound judgment demands that no more capital than is necessary be tied up in stock; for this after all, from a financial standpoint, is the chief asset and liability of any mercantile establishment.

To keep stocks of sufficient quantity without getting overstocked is a problem involving two big factors—*buying right* and *selling right.*

As to buying: Too many concerns allow their storekeepers to be buyers while at the same time maintaining a centralized purchasing department. The stores swarm with drummers and salesmen, some of whom could sell patent rights in washing machines to Hetty Green, much less the average commissary storekeeper. The first thing to do here is to centralize your commissary buying. Let the purchasing department do it all, and keep the drummers out of the stores. You'll be surprised how quickly the volume of orders will decrease and how fast your excess stocks will be depleted.

As to selling: When you've bought right, you'll find the selling problem is wonderfully simplified; in fact, it almost takes care of itself. When your storekeepers can't buy stuff they really don't need, the surplus simply isn't there to sell—and that's all there is to it.

This suggestion about buying is one with meat and money in it for any concern operating a company store. Try it and see.

Rotary Transforming Equipment for Coal-Mining Work

By Thomas Robson Hay*

SYNOPSIS—There are three types of rotary transforming or converting equipment. Each type has its own advantages and disadvantages, which are here discussed.

In considering the application of central-station power to coal-mining work it is necessary to use care in making the selection of the proper equipment to convert the alternating current supplied by the central station to direct current for use in the mine.

Three types of rotary transforming equipment are available—(1) rotary converters, (2) synchronous motor-generator sets and (3) induction motor-generator sets. The following is a comparison of the relative merits of the several types of equipment.

A Substation Showing 2200-Volt Lightning Arresters of the Outdoor Type

The overall efficiency of the synchronous motor-generator set is about 4 to 7 per cent. less than the overall efficiency of the rotary converter, while the overall efficiency of the induction motor-generator set is about 2 per cent. less than that of the synchronous motor-generator set. In fact, when the character of the load, which may vary from practically zero to more than full load almost instantaneously, is taken into consideration, it will be found that the difference in efficiency between the synchronous motor-generator set and the rotary converter with transformers will be slight.

In large installations where a great number of rotary transforming units are necessary it may be found that the theoretical difference in efficiency between the rotary converter with transformer and the synchronous motor-generator set may apparently have a considerable effect on the power consumption as indicated by the meter, but before making a definite selection careful consideration should be given not only to the theoretical full-load and fractional-load efficiencies, but also to the varying character of the load, with its consequent effect on the efficiency and regulation of the equipment, to the cost of upkeep and attendance and to the relative factors of simplicity and reliability.

The operation of the rotary converter on 60-cycle power is not as satisfactory as that of the synchronous motor-generator set or the induction motor-generator, except under unusually good regulation of the source of energy and when machines of comparatively small size are used. With the large machines it is necessary to select a slow speed equipment on account of the necessity of keeping the peripheral operating speed of the commutator within safe limits, and this necessity actually affects the comparative first cost.

Such limitations are not present in either the synchronous or induction motor-generator set and exist to a less degree in the rotary converter when operating on 25-cycle circuits. While the regulation of the voltage and frequency in most stations is good, it is not exceptionally so in long transmission systems operating under the severe conditions imposed in coal-mining work.

Synchronous Motor-Generators Are More Stable

Synchronous and induction motor-generator sets are considerably more stable, even when operating on wide ranges of voltage and frequency variations, than are rotary converters. Sudden overloads have a much greater effect on rotary converters than on synchronous and induction motor-generator sets owing to poorer speed regulation on varying voltages. The rotary converter is more apt to flash over, especially on high momentary overloads because of grounds and short circuits, and is also more likely to hunt than is the synchronous motor-generator set.

A more skillful class of attendant is required for the operation of rotary converters than for motor-generator

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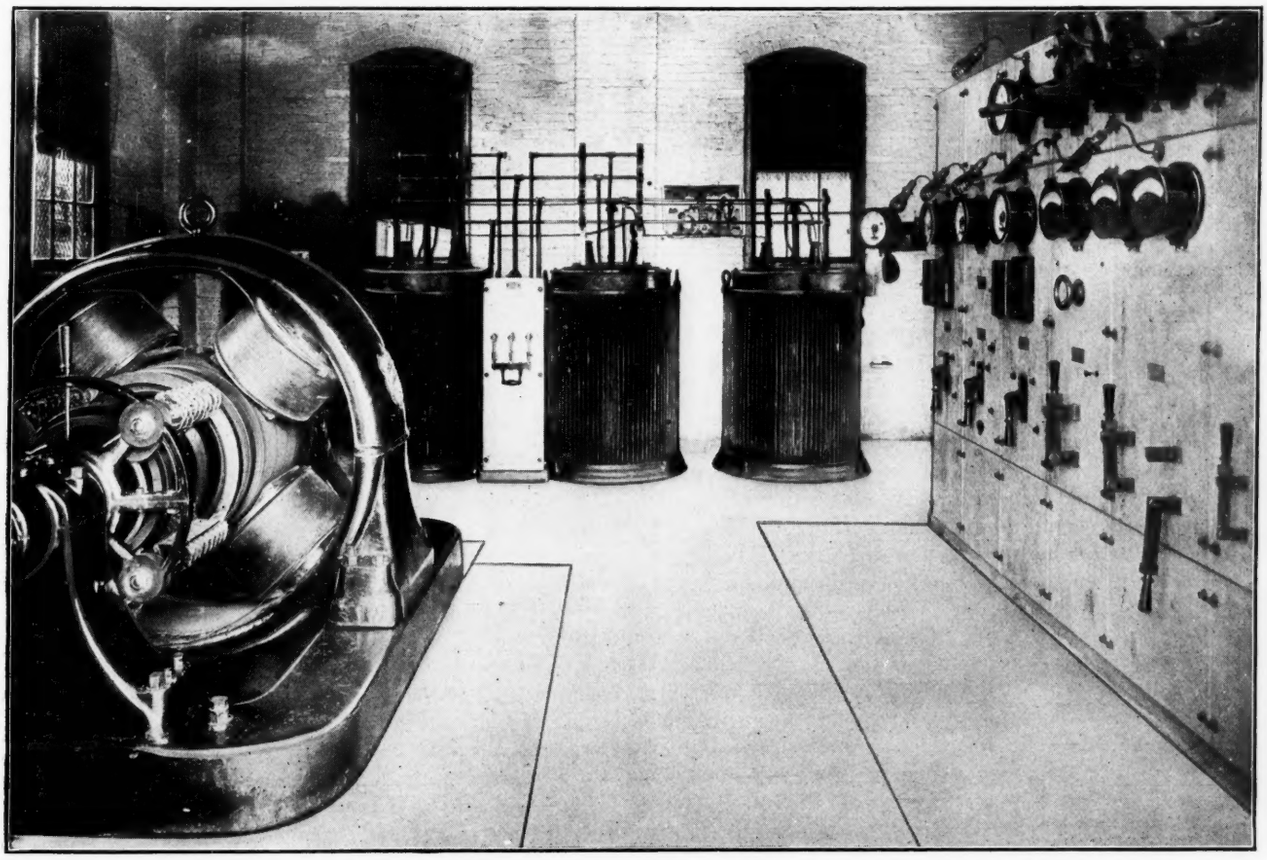
sets. This is owing largely to the operating characteristics of the machines, such as the necessity for synchronizing when starting and also on account of the peculiar features of the direct-current circuit when supplied from this type of equipment. The general absence of mechanical and electrical characteristics of simplicity and stability of operation under varying conditions of load, voltage and frequency are unfavorable features of rotary-converter installations. This is especially true when the sudden and more or less frequent and sustained heavy overloads that are too often present in coal-mining work are encountered.

The performance of the rotary converter when the supply circuit is subjected to transmission-line surges due to broken insulators and grounds is not nearly as satisfactory as that of the synchronous motor-generator set, and flashovers result, with consequent burning of the brush-holders and commutator. On account of the substantial design and construction of motor-generator sets and also on account of their much greater flywheel effect the adverse conditions brought about by grounds, heavy momentary or sustained overloads and line surges are much more efficiently and satisfactorily handled.

Rotary-converter equipment, including the rotary itself, transformers, starting devices, etc., is much more complex than are motor-generator sets, and a more experienced and intelligent operator is required. This matter of attendance should be given due consideration when the selection of the rotary transforming equipment is made. Satisfactory operators of any kind are scarce around most coal-mining operations, and efficient, intelligent ones are few, far between and hard to keep.

The regulation of the direct-current voltage of motor-generator sets is independent of the presence of motors on the alternating-current side of the power supply and has no appreciable effect on the power factor of the supply voltage if the available power-factor correction is applied. The regulation of the direct-current voltage of the rotary converter is possible, but change of the direct-current voltage causes change of power factor in a self-excited equipment.

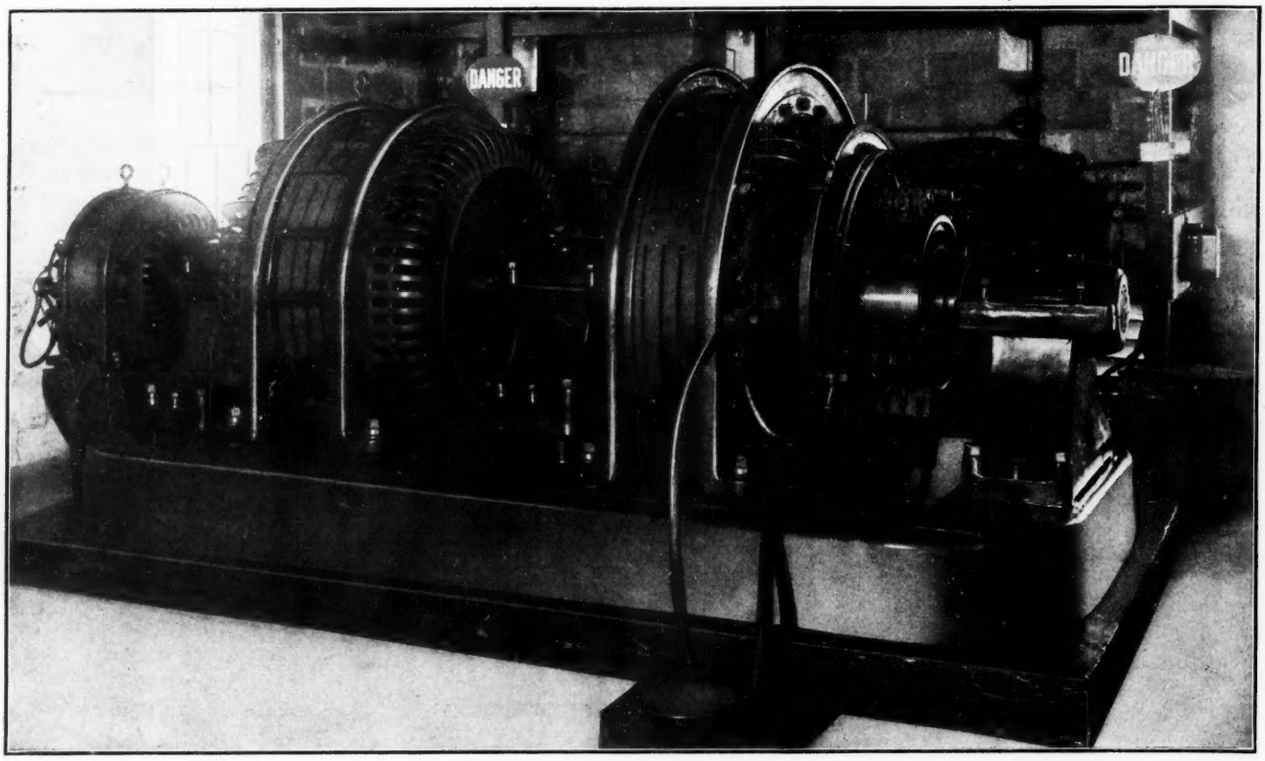
As a result the desired direct-current voltage may not at all times bring about the desired power factor in the alternating-current supply circuit. Except for the comparatively slight amount of compounding possible in a rotary converter, the direct-current voltage is directly dependent on the alternating-current voltage and is always in a definite ratio to it. The addition of a synchronous booster or of other methods of increasing the direct-current voltage acts to increase the initial cost of the installation and to further complicate the equipment.



AN ALLIS-CHALMERS ROTARY CONVERTER IN A SUBSTATION OF THE H. C. FRICK COKE CO.

ALTERNATING- AND DIRECT-CURRENT VOLTAGES ARE INDEPENDENT

Regulation of the power factor of the alternating-current supply can be effected with both the rotary converter and the synchronous motor-generator set, the power-factor regulation with the former causing changes in the direct-current terminal voltage, owing to the resulting change in line drop, while with the motor-gen-



SYNCHRONOUS SELF-STARTING MOTOR-GENERATOR SET, MEADOWLANDS COAL CO., ARDEN, PENN.

erator set, the alternating- and direct-current voltages are entirely independent of each other.

Because of the electrical characteristics of the induction motor-generator set, this type of equipment will always have a varying, lagging power factor, which will in turn cause a lag in the power factor of both the transmission line and of the power-station equipment and will act to decrease the capacity of all apparatus from the source to the point of delivery of the power.

This unfavorable feature of the induction motor-generator installation is not inherently capable of correction. This statement would also be true of the synchronous motor-generator set did it not possess an electrical feature permitting of improvement of the power factor through overexcitation of its fields from a separate source of direct-current power. This power-factor improvement can be made as great as desired, but it has been found that an attempt to improve the power factor of the supply circuit when taken from a transmission line to a point much above 95 per cent. lagging is not economically desirable, as the cost of doing so is out of all proportion to the advantage gained.

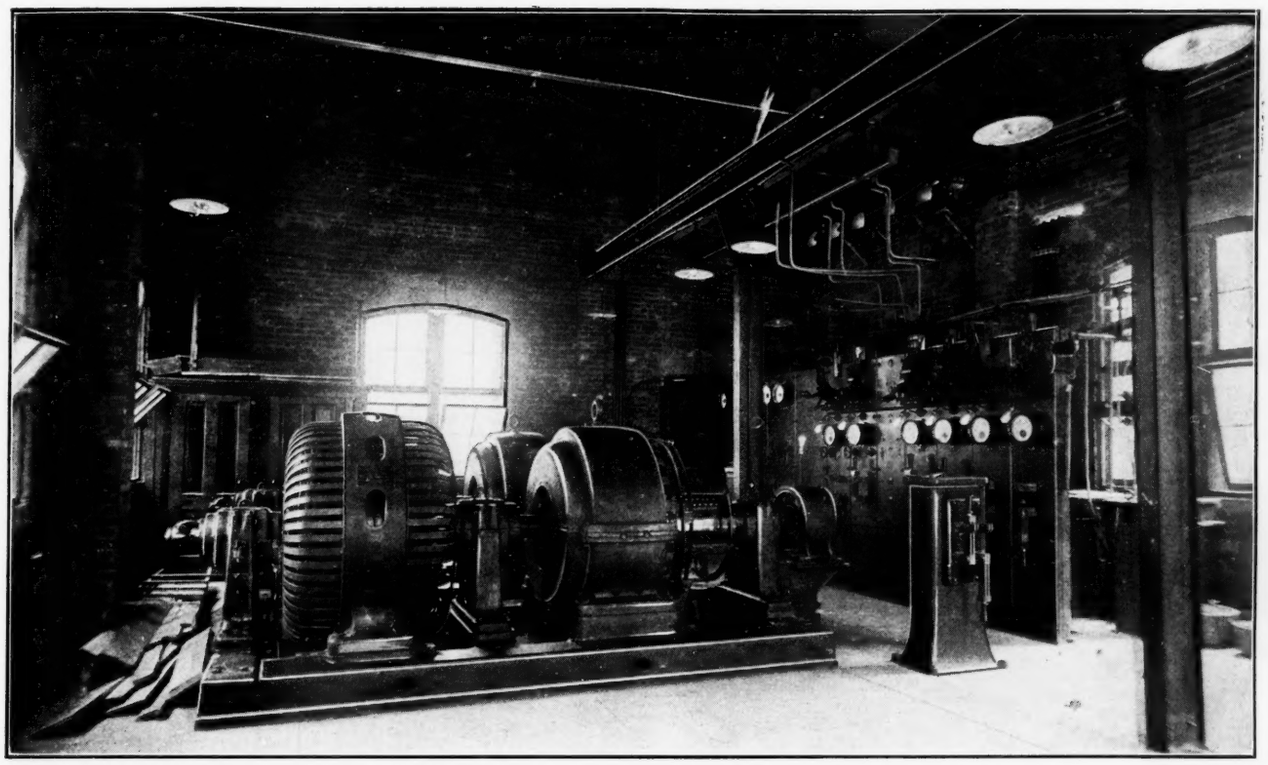
Power-factor correction as high as is economically possible is desirable because of the resulting increased overall efficiency of the equipment operating on the particular system and the increased power capacity of this equipment. By raising the power factor of a system the capacity of the transformers, transmission lines, and equipment operating thereon is materially augmented owing to the decreased flow of wattless current and consequent decreased losses, which increase as the power factor decreases.

Both the rotary converter and the synchronous motor-generator set can be made to operate at unity power factor, but it should be remembered that this is not the power factor of the system, but of the machine itself. The power factor of the system will depend largely on the compensating, or corrective, features available, the motor-generator set giving the best and most stable results. On account of the better compounding characteristics of the synchronous motor-generator set, this machine can be designed to furnish a leading power factor for all loads much in excess of the rotary converter, while at the same time retaining other desirable operating features.

The cost of the rotary converter complete, including reactance, transformers, oil and starting equipment, will be slightly less than that of the synchronous motor-generator set when the switchboard is included, but the cost of maintenance will be no less and if anything greater. If the operating characteristics of the installation, such as wide voltage and frequency variations, require the addition of accessory equipment to obtain satisfactory operation of the rotary converter the cost will be made to equal or exceed that of the synchronous motor-generator installation.

The cost of the induction motor-generator set would be about the same as the cost of the synchronous equipment, but it has not been favorably considered for coal-mining work, as it does not have sufficient points of advantage over the rotary converter and the synchronous motor-generator set to offset any decrease in first cost together with its less complicated operating characteristics.

The induction motor-generator set operates at an inherently constant speed under varying loads, but with a low power factor which decreases with decrease in load. Its power factor, as before mentioned, is not capable of alteration, and in starting it draws a large current from the line, which tends to affect the alternating-current distribution system clear into the power station.



Synchronous Motor-Generator Substation of the Clinchfield Coal Corporation

In the case of the rotary converter, the secondary alternating-current voltage of the transformers must be in a fixed ratio to the direct-current potential, which for mining service is usually 250 volts, and thus the transformer secondary voltage is not one that is standard for alternating-current motors and necessitates the use of a special voltage motor or an extra bank of transformers to furnish a standard potential for any motors that may be in use about the mine, such as on pumps, fans, tipple machinery, etc.

The impressed voltage for motor-generator sets can be a standard motor voltage for 4000-volt installations, Y-connected 2300-volt motors insulated for 4000-volt operation being used. If the transmission voltage is anything below 4000 volts it is of course possible to use a standard motor of the given voltage, whether a rotary converter or motor-generator set is selected. No additional transformers are required, however, when a motor-generator of a voltage of 4000 and below is employed.

It is of course permissible to use transformers with standard motor voltage secondaries by introducing reduced voltage taps to supply the proper potential for the rotary converter. This method of procedure, however, will affect the efficiency and regulation of the transformers, the resulting unstable regulation in turn affecting the voltage regulation of the rotary converter and the overall efficiency and cost of operation of the equipment.

Generally speaking, it is advisable, where the primary voltage exceeds 4000, to use two banks of transformers for rotary-converter installations, whereas only one bank, and sometimes none, is required for a motor-generator installation. Motor-generator sets operating on 6600-volt circuits and higher are possible and have given satisfactory results, particularly in the larger sizes, but the use of small- or medium-sized induction motors operating at such a comparatively high pressure is not satisfactory due to the excessive amount of insulation, with decreased motor efficiency, necessitated by the use of this voltage. It is better practice to make the transformed voltage of such a value as to enable the use throughout of standard and efficient equipment.

The features mentioned in the foregoing alter the several first costs and favor the motor-generator as regards space economy.

Independent Field Excitation Is Necessary

With the synchronous motor-generator installation, field excitation for the motor from an independent source is necessary. This source can be either the direct-current generator of the set, the synchronous motor fields in this case being wound for 250-volt excitation, or a belt-driven or direct-connected exciter delivering 125 volts. The former is to be preferred as it decreases the initial investment by the cost of the exciter and belt and economizes in space.

For equipment supplying energy to a 500-volt mine circuit, separate excitation of the field of the synchronous motor by means of a separate exciter is necessary. Most direct-current generators for mining work are compound wound with 10 per cent. overcompounding from no load to full load. By exciting the synchronous motor fields from the direct-current side of the set, the field strength automatically increases with the load, maximum excitation being obtained at full load. Setting the field rheostat for a given excitation at no load, that at full load, and therefore the power factor, can be closely predetermined and the correction made automatic for all percentages of load.

The 10-per cent. overcompounding, which is common on motor-generator sets for coal-mining service, is of

decided advantage when the excitation is taken from the direct-current side of the set. The usual practice is to so proportion the synchronous motor that a 10-per cent. increase in field current will maintain approximately the same power factor at all loads, with resulting constant line voltage and frequency.

This feature has an interesting and valuable effect when the set is installed at the end of a long line on which there is more or less lighting. On such lines the transmission voltage is usually high at no load in order that it may not drop too low at full load or on overloads. Under these conditions the power factor of the motor-generator set will be unity or slightly lagging at no load or on light loads and will lead on the heavier loads. This action has a strong "steadying" effect, tending to decrease the no-load and to hold up the full-load voltage. With alternating-current induction motors installed for fans, pumps, tipple machinery, etc., this "steadying" effect is especially valuable.

The desirable features enumerated above are not possessed by the rotary converter to nearly as great an extent as by the synchronous motor-generator, since it is not possible to raise the direct-current exciting voltage in as automatic and satisfactory a manner on account of its dependence on the impressed alternating voltage. In fact overcompounding of the rotary converter has a bad effect on the power factor and is not generally considered advisable.

When it is decided to use a motor-generator set, the initial investment is capable of reduction to a minimum on account of the possibility of using the old direct-current generators in the isolated plant, providing they are of the belted type as the direct-current element of the motor-generator set. To this end they may be either belted or direct connected, preferably the latter.

Direct connection in most cases requires a comparatively slow-speed machine, as most belt-driven generators used in coal-mining work have a speed rating varying from 500 to 600 r.p.m. A synchronous motor of this speed is more expensive than a higher-speed motor of the same capacity, but in considering this application it must be borne in mind that a direct-connected set is more efficient on account of the elimination of belt losses and requires much less floor space than a belted set. The cost of a belt will be about the same as or more than that of a suitable flexible coupling. In either case the machines should be mounted on concrete foundations.

It may be found after a full investigation that the cost of a new two-unit direct-connected high-speed set will be but little more than that of a slow-speed synchronous motor with coupling for direct connection. Furthermore, besides obtaining all of the advantages of the made-up direct-connected outfit, the latter will possess the additional advantage of being new and decidedly more efficient.

The interruptions to service when the rotary converter is used will be greater than when motor-generator sets are selected, owing to the former's greater sensitiveness to suddenly varying loads and to prolonged overloads. In case of a burn-out on a rotary converter the whole machine is useless, whereas with a motor-generator set it is possible to make a temporary arrangement pending the repair of the damaged part on account of the fact that this equipment consists of two separate elements. This, in conjunction with the independent voltage and power-factor regulation, is usually considered of such an advantage as to more than offset any difference in first cost and operating efficiency and to justify the use of a motor-generator set.

This type of equipment also has the additional advantage that no collector rings carrying high currents and requiring careful insulation are present as is the case with the rotary converter. This feature will tend to decrease the upkeep on the alternating-current side of the motor-generator set. Such an installation is also somewhat more stable and satisfactory for parallel operation.

Fans and Pumps Should Be Driven by Alternating Current

In determining the necessary capacity of the rotary transforming equipment, it should be the business of the interested parties to install where possible alternating-current motors on such machines as fans, pumps, hoists, slope hauls, etc. The use of alternating-current motors taking power from the transmission line or from the secondaries of the high-tension step-down transformers obviates the transformation losses that occur in the rotary transforming equipment, thereby reducing the power bill to a minimum. This also reduces the size of the rotary transformer, and therefore the initial investment, and tends to make the overall cost of operation a minimum.

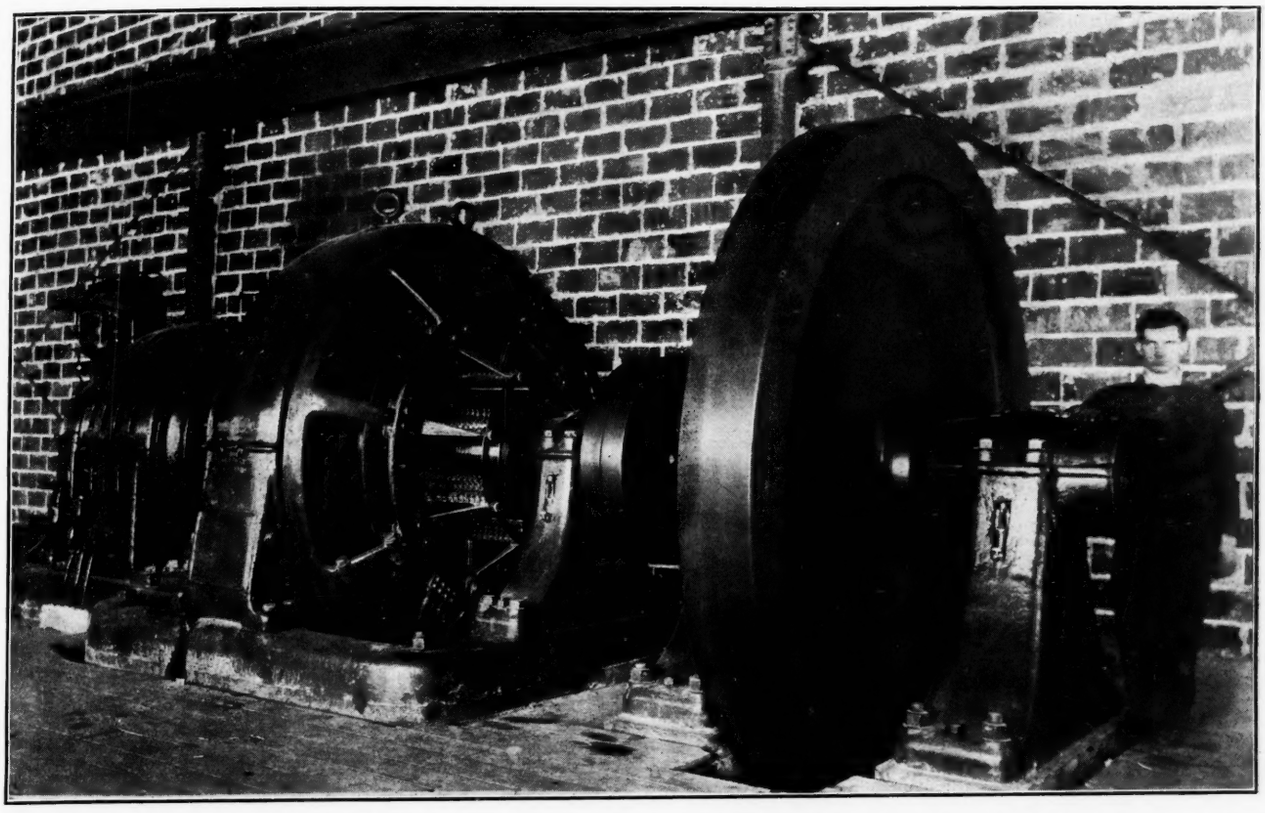
In cases where it is necessary to use motors for hoisting, either in shaft or slope, the use of alternating-current motors throws the wide fluctuations of current and voltage that frequently occur onto the transmission line, where they are more easily taken care of than when a direct-current motor is used taking its power from the direct-current side of the rotary transformer.

Inasmuch as the power is usually metered on the alternating-current side of the rotary transformer, a considerable saving in cost of operation can be made by placing as little equipment as possible on the direct-current circuit. This saving will usually be found to more than compensate for the increased cost of installation. The steadier the direct-current voltage, the fewer will be the burn-outs and the higher the efficiency of the equipment operating on the direct-current side.

In order to utilize central-station service to the best advantage and to keep the power cost to a minimum, the rotary transforming equipment should be located as near the center of distribution as possible. On account of the ability to place the rotary transforming equipment at any convenient point, such a condition can be obtained at minimum expense; and from time to time as the changing conditions seem to make it advisable the set may be relocated so as to give the most economic and efficient arrangement possible and at the same time accomplish the desired result.

If the cover is not too great it is usually best to select a surface location for the installation of equipment, taking the direct-current feeder wires down through bore holes to the selected point of distribution inside the mine. When the set is located on the surface it should be placed if possible so as to make unnecessary the devotion of the entire time of an attendant to its operation.

The set may also be located inside the mine, but such procedure is not generally recommended on account of



A Flywheel Induction Motor-Generator Set in Plant of the Christopher Coal Co., Christopher, Ill.

the dirt, the fire and water hazard and also on account of its general inaccessibility. If so located, however, the equipment should be installed in a moisture- and fireproof concrete room. Either solid or stranded copper cable wound with varnished cambric insulation of the proper quality and thickness and with a triple-braid, impregnated, weatherproof covering may be used to convey the current to the machine.

This wire will be suspended at the top of the hole on a tripod, set in a concrete foundation. The economics of the application will be largely determined by the conditions of roof and bottom, presence of water or gas, distances from the working-face, main parting and pit-mouth, fire hazard, attendance, etc. No set rules can be laid down, but each case should be thoroughly gone over and the application made on the merits of the investigation.

The transmission and distribution system inside the mine should be made as efficient as possible. Rail-bonding should be in first-class condition with cross-bonding at intervals of 200 or 300 ft. All bonds should be inspected frequently. The feeder and trolley wires should be securely put up and care taken that there is no leakage and that the wire used is of ample capacity to handle the load without excessive loss.

The losses due to poor bonding and feeder-line construction may, and in many cases do, materially affect the efficiency and upkeep of the electrical equipment as well as the output of the mine and may make an appreciable difference in the power bill. Excessive use of sand by the locomotive drivers should also be guarded against as a considerable amount of power may be consumed in this manner.

Summary

In summation, it may be said that—

1. The synchronous motor-generator set, while slightly higher in first cost and lower in theoretical overall efficiency than the rotary converter, is simpler and more reliable in operation.

2. By means of the synchronous motor-generator set any desired power factor can be readily and satisfactorily obtained without the addition of any special features to the equipment.

3. With the synchronous motor-generator set, interruptions to service are a minimum, voltage and frequency variations are less harmful to the continued satisfactory operation of the set and the direct-current voltage can be adjusted to any desired value, irrespective of the fluctuations within reasonable limits of the alternating voltage.

4. The synchronous motor-generator set is easier to operate than the rotary converter and is more reliable under the severe conditions imposed by a coal-mining load.

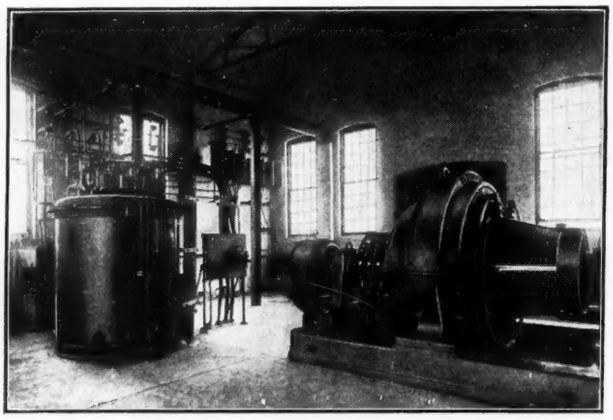
5. The use of the synchronous motor-generator set when taking power from the secondaries of high-tension stepdown transformers enables the use of standard alternating-current motors about the mine taking power from these same transformers and without any special features.

6. On account of the increased capacity of the equipment and the decreased line losses, because of the possibility of adjusting the power factor to any desired value, the central stations usually give a discount for the use of synchronous equipment. This feature, which is common to a greater or less extent in both the rotary con-

verter and the synchronous motor-generator set, enables the consumer to make a saving in the cost of operation, which in large plants may be considerable, thereby compensating for any increased first cost of installation.

It should be remembered that the power-station attendants available at most coal mines do not possess much technical information and that what they have is usually confined to direct-current equipment. Motor-generator sets which combine features of simplicity and reliability in operation, good economic and operating characteristics and practically fool-proof construction should therefore favorably recommend themselves to coal-mining operators.

Reliability and simplicity, combined with reasonable first cost and cost of operation, are the desired results.



A Westinghouse Six-Phase 25-Cycle Synchronous Rotary Converter

Selection and application of the equipment to be used should be made only after the proposition has been carefully considered in all its related phases and full and just consideration given to the various features favorable and unfavorable to be found in the different types of equipment available. Every application presents a problem in itself and requires its own individual solution. No hard and fast rules can be either laid down or followed.

Burn Your Dynamite Cases

When dynamite is spread on the ground, so that as large a surface as possible is exposed, it generally burns peacefully on ignition and does not explode. The presence of metallic articles, such as wire and nails (and of course blasting-caps), makes an explosion likely. It is essential when destroying dynamite to remove it from the wooden case because of the nails by which the latter is held together.

Dynamite cases should be burned separately from the dynamite, because when they become saturated or stained with exuded nitroglycerin they almost always explode when burned; but if no dynamite is placed in the bonfire the explosion is generally not sufficiently severe to do any damage.

To set fire to the boxes, soak some excelsior or waste in gasoline and put one end of a piece of fuse in this, being careful to light the other end first. Have the fuse two or three feet long and the waste or excelsior under the empty dynamite cases. Or you can lay a train of excelsior and light one end with a match and run.

Dynamite cases showing any signs of being stained should never be used for fuel, but should be promptly destroyed in the manner described. If they blow up in the open, with everybody at a safe distance, they will do no harm, but if they blow up in the kitchen stove probably somebody will be badly hurt or killed and the house burned down. Don't take any chances.—E. I. du Pont de Nemours Powder Co.

Extracts from a Superintendent's Diary

The arrival of two salesmen at our camp today, loaded down with electric mine lamps for demonstration purposes, has recalled to my mind that styles have been changing even in miners' lamps. Leaving safety lamps out of consideration, the electric lamp is the fourth system of mine illumination to have a vogue during the 15 years that I have had occasion to keep posted on such matters.

First we had lamps to burn miners' oil, then "sunshine," then carbide and now electricity. Each change has called for a liberal supply of demonstrators, and there have been times when these salesmen added considerably to the income of our camp's boarding-house.

The methods employed by the manufacturers for the introduction of each of these systems have been very much alike. First the salesmen work on a few of the most progressive men until they get their curiosity aroused to a point where they are willing to make a trial. While the agent is on the ground the test is very satisfactory; after he leaves his pupils begin to have trouble, and finally so many of their associates have remarks to make that they decide pioneering isn't worth while. Shortly thereafter in some unaccountable manner the new system begins to make converts, and in the end everybody adopts it; the last ones to come over are the ones that first took an interest in the new light.

When I was young at the mining business I didn't take kindly to experiments, and the agents who tried to get me weaned from miner's oil had an interesting time of it. Fortunately they were not easily discouraged.

Some of my men were anxious to get a day off because of a circus that had been effectively advertised (I wonder if the demand for coal will ever again become so pressing that superintendents will resent a request from the men for an idle day), and because a lamp salesman saw the possibilities in such a situation, the men got the holiday and the lamp company worked into favor with its lamp.

Miners' oil had always been a rather variable product, and whenever the miners made a kick about the quality of a particular barrel, it was pretty difficult to discredit them. The lamp salesman realized this, and learning through inquiry that our commissary had just received a fresh shipment of oil the previous day, decided to stake his chances on a little plot.

The next day, the day of the circus, he got all of the drivers and some of the miners to come to the top about 10 o'clock declaring that the oil they had received from the commissary that morning made so much smoke that they could not remain longer in the mine. Then they all went home, and I sent a long telegram to the oil company

telling them of our troubles and demanding an explanation.

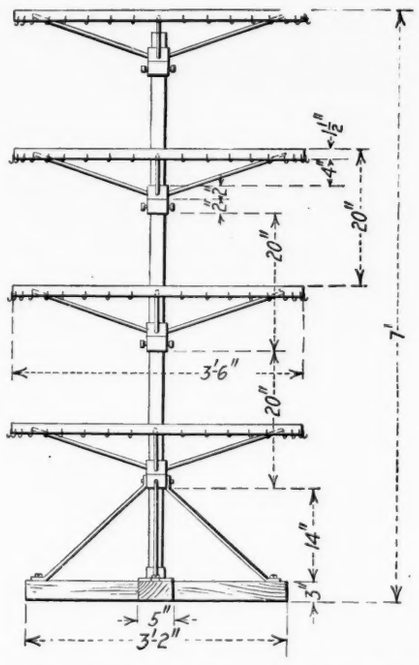
They wired back that they would have another barrel at our commissary by morning and requested us to return the shipment that had given the trouble. This looked like an acknowledgment of crooked work on their part, and I decided to give the lamp salesman all possible encouragement, hoping to cut out the use of miners' oil altogether.

About a week later we received a report from the oil company informing us that they had traced our trouble to a shipping clerk who had shipped us a wrong grade of oil by mistake. They assured us that it would not happen again and begged for a continuance of our business.

A Safety-Lamp Rack

By M. D. Cooper*

A simple and easily made safety-lamp rack is shown in the accompanying sketch. It consists essentially of a piece of 2-in. pipe about 6 ft. 8 in. long; four pieces of strap iron ¼ in. thick, 1½ in. wide and 11 ft. 1 in. long;



A Simple and Practical Lamp Rack

24 rods for spokes, each of ½ in. diameter and 20¼ in. long, and four rods of ⅝-in. material and 24 in. long for braces.

The foundation of the rack is made up of two blocks of wood, each 38 in. long, 5 in. wide and 3 in. thick. Across the middle of each block a slot 5 in. wide and 1½ in. deep is cut, so that the two may be crossed and made to fit flush on top and bottom. A screwed flange to receive the pipe is attached to the center of the intersecting blocks. The pipe having been screwed into place, a loose sleeve of ½-in. material, drilled and threaded for four setscrews, is slipped over the pipe and made fast at a distance of 14 in. from the bottom, the braces being secured at the same time by the setscrews.

The straps are drilled at intervals of $3\frac{11}{16}$ in. with holes of sufficient size to pass a 20-penny nail. Then the straps are bent into circular form and riveted, forming a circle 42 in. in diameter. The spokes, six in number, are riveted to the circular piece, the other ends being sunk into the hub. The hub fits loosely over the pipe and revolves around it, being supported on the clamp fastened by setscrews below it. Through the holes in the ring, 20-penny nails are placed and then bent over to form hooks.

The capacity of the rack is 36 lamps on each ring, or a total of 144 lamps. There is space enough beside each hook to stencil the number of the user of the lamp.

*Ellsworth, Penn.

Russian Coal Supply

A recent decree authorizes the Russian Minister of Ways of Communication to take into his hands the supplying of fuel to the army and navy, the ways of communication and the manufacturing concerns producing supplies for the army, says Consul General John H. Snodgrass, of Moscow, in *Commerce Reports*. The minister is to unite and coördinate the activity of all concerns which up to now were engaged in supplying the country with fuel. Besides, the minister is authorized to request information from all persons and institutions concerning their supplies of fuel and to control all the supplies of fuel in possession of private persons and firms.

The reason for this decree is the fuel shortage that has made itself felt in Russia. During the last few months the output of coal at the Donetz mines has shown a considerable reduction. The beginning of the war caused a marked reduction, but the production soon assumed a more or less normal course, and the output of last November had almost reached the usual level. However, from the end of the year the output began to decrease and from 2,880,000 short tons produced in November fell to 2,574,000 short tons in December and to 2,432,500 short tons in January, 1915. At the same time the demand for coal had increased. The usual consumers had been joined by a number of concerns in the Baltic and some of the Polish provinces which had formerly used coal from the Dombrovsk district. In ordinary times the consumption of foreign coal in Russia reaches 540,000 to 720,000 short tons; that is, about one-quarter of the entire production of the Donetz district. A number of concerns that are now exceedingly busy furnishing supplies for the army used to work with foreign fuel. It is natural that the requirements of such concerns had to be satisfied first, and this reduced the amount available for the usual customers of the Donetz coal.

The chief reason why the existing supplies of coal are not available is the disorganization of railway traffic. The coal supplies at the mines reached 1,440,000 short tons on Feb. 1, but a considerable part of this quantity cannot be transported in consequence of the insufficient and irregular supply of freight cars.

Measures will perhaps be taken to attract more working hands to the mines. It has also been suggested that some of the railways and manufacturing concerns should replace coal by other fuel, principally oil.

To promote production at the coal mines, the Council of Ministers has approved the following measures: Free transportation of workmen contracted for the mines, admission of women and minors as workers in the mines and liberation of miners from military service.

Does Your Economizer Economize?

By James T. Beard, Jr.*

SYNOPSIS—The ratio of the number of square feet of heating surface in an economizer to the boiler horsepower determines the degree of economy obtained. For any boiler installation this point of maximum saving can be calculated.

The question of efficiency and economy is attracting the attention of managers in all lines of work, commercial as well as industrial. In power plants, especially, this question is of great importance; for the plant which can operate at the least cost can certainly sell power the cheapest, other conditions remaining equal.

The economizer is one of the means of reducing the cost of power-plant operation. Let it be understood, however, that the economizer does not always reduce expenses. Whether it will do so or not depends in a large measure upon the curve load factor, the cost of coal at the plant in question, the efficiency of the boilers and other considerations. In this article the author intends to show how to calculate the loss or saving involved in the installation of an economizer in a hypothetical plant.

Consider, first, the effects which such an installation will have on the conditions already existing. The economizer is placed in the path of the flue gases as they pass from the boiler to the stack. There will be greater resistance, therefore, to the flow of these gases than before. This means that, in order to obtain the same rate of combustion, it will be necessary to increase the draft. This can be done, either by building a higher stack or by installing mechanical apparatus which will supply the additional draft required.

Furthermore the temperature of the flue gases is decreased, owing to the fact that they give up some of their heat to the feed water as they pass through the economizer. This decrease in temperature has the effect of decreasing the draft available with a given stack. Hence, this fact affords an additional reason why the height of the stack must be increased or a mechanical draft system installed to furnish the extra draft necessary.

On the other hand, the feed water is heated in the economizer to a higher degree than is possible in a feed-water heater. Less heat is necessary under the boiler, therefore, to give the required evaporation. This means, of course, a saving in the fuel consumption. Besides this coal conservation, however, there is also a saving in the installed capacity of the boilers. Since one boiler horsepower is equivalent to the evaporation of 34.5 lb. of water per hour from and at 212° F., or 33,478 B.t.u. per hr., if less heat is required per hour, less boiler horsepower is necessary.

A 1000-Hp. Plant Is Assumed

Keeping the above facts in mind, let us assume that we are going to construct a power plant and wish to ascertain whether it will save us any actual dollars and cents to include an economizer in the installation. For the sake of discussion we will suppose that this plant will comprise 1000 boiler hp. and has a curve load factor of 0.8 on a basis of 365 days a year, 10 hours a day. Dry saturated steam is to be generated at 150 lb. gage pressure by boilers whose efficiency is 65 per cent. The calorific value of the coal to be used is known to be 14,500 B.t.u. per lb., and, in order to simplify calculations, we will assume that there is no ash. It should be noted, however, that in an actual determination of this sort allowance must be made for this refuse.

A feed-water heater is to be used at the plant, even if it is found inadvisable to install an economizer. The temperature of the feed entering the economizer, therefore, will be in the neighborhood of 208° F. The flue-gas temperature without the economizer will be assumed as 550° F.

Let us first see what the theoretical coal and steam consumptions in such a plant will be. A boiler horsepower has been defined above as the evaporation of 34.5 lb. of water per hour from and at 212° F. Now since it requires 970.4 B.t.u. to evaporate 1 lb. of water at this temperature 1 boiler hp. represents 970.4×34.5, or 33,478 B.t.u. per hr. Since the boiler efficiency is 65 per cent., the amount of heat necessary under the boiler to give 1 boiler hp. is equal to $\frac{33,478}{0.65}$, or 51,505 B.t.u. per hour. Hence, the coal consumption will be $\frac{33,478}{0.65 \times 14,500}$ or 3.55 lb. per boiler hp.-hr.

The total heat content of the steam generated above 32° F. is found from the steam tables to be 1195 B.t.u. per lb. The heat content above 208 F. will be, therefore, 1019 B.t.u. per lb. This value represents the amount of heat required to evaporate 1 lb. of water in the boiler at 150 lb. gage pressure. The water rate will then be $\frac{33,478}{1019}$, or 32.8 lb. steam per boiler hp.-hr.

Area of Heating Surface Is an Important Factor

It is evident that the area of the heating surface of the economizer exposed to contact with the flue gases is one of the factors which will govern the amount of heat that will be transferred from these gases to the feed water in a given time. Thus, the temperature rise of the feed will depend in part on the area of this heating surface. In selecting an economizer it is customary to so proportion the square feet of heating surface to the boiler horsepower that the ratio between these two quantities will lie somewhere between 1:3 and 1:5. For our case we will assume that this ratio is 1:4.

We are now in a position to calculate the rise in temperature that such an economizer will produce in the feed. In this calculation we will employ the formula in use by the Green Economizer Co., as follows:

$$T = \frac{y\,(T_1 - t_1)}{\frac{w}{U} + \frac{5\,w + GC}{2\,GC} \cdot y}$$

Where

T = Temperature rise in feed (deg. F.);
T_1 = Temperature of flue gas entering economizer (deg. F.);
t_1 = Temperature of feed water entering economizer (deg. F.);

*Combustion Engineering Corp., 11 Broadway, New York.

w = Pounds feed water, per boiler hp.-hr.;
G = Pounds flue gas, per lb. of combustible (assumed as 20);
U = Rate of heat transfer per sq.ft. of economizer surface per hour per degree of difference between the temperatures of gases and water (asumed as 3.3 B.t.u.);
C = Pounds coal per boiler hp.-hr.;
y = Area in square feet of heating surface, per boiler hp.

Substituting values in the above equation we have

$$T = \frac{4\,(550 - 208)}{\frac{32.8}{3.3} + \frac{5 \times 32.8 + 20 \times 3.55}{2 \times 20 \times 3.55} \times 4} = 82.5^\circ\ F.$$

That is, the feed-water temperature is increased 82.5° F. above 208° F., and enters the boiler at 290.5° F. instead of at 208° F., as before. On the entire plant we are thus saving 32.8 × 1000 × 0.8 × 82.5, or approximately 2,165,000 B.t.u. per hr. Expressed in boiler horsepower this saving represents $\frac{2,165,000}{33,478}$, or 64.6 boiler hp. In other words, we are saving 64.6 boiler hp. on the installed capacity of the plant; and, if we figure this at $20 per hp., we save 20 × 64.6, or $1290 on the first cost of the plant.

We must not forget, on the other hand, that we have also added to the first cost by buying this economizer. We can roughly estimate this additional cost as follows:

Total sq.ft. heating surface = 4 × 1000 =	4000
4000 sq.ft. @ $1 per sq.ft.	$4000
Cost to install @ $0.20 per sq.ft.	800
Total	$4800
Less saving in boiler hp.	1290
Net increased first cost	$3510

A yearly charge of 20 per cent. of this cost must now be made to take care of interest on the investment, depreciation, repairs, taxes, insurance, operation and general office expense.

It is evident, then, that, thus far, the economizer involves a yearly expense of 3510 × 0.20, or $702.

The Reduction in the Coal Bill

In one of the preceding paragraphs it was stated that the extra heating of the feed water resulted in a saving of approximately 2,165,000 B.t.u. per hr. It follows, then, that the coal bill will be considerably cut. The extent of this reduction is readily calculated.

$$\textit{Lb. coal saved per hr.} = \frac{32.8 \times 1000 \times 0.8 \times 82.5}{14,500 \times 0.65}$$

$$= 230\ \textit{lb. per hr.}$$

$$\textit{Tons coal saved per yr.} = \frac{230 \times 3650}{2000}$$

$$= 420\ \textit{tons per yr.}$$

If we assume that in the locality where our plant is situated coal sells at $3 a ton, then the yearly saving represented by this reduction in fuel consumption is 420 × 3, or $1260.

There remains now for our consideration only the loss due to the fact that some device must be provided to supply extra draft for the plant. If the saving on our fuel bill is greater than this loss plus the yearly charge on the economizer, then our installation has been a success.

It was previously stated that the loss in draft could be made up either by increasing the height of the stack or by installing a mechanical draft system. In view of the difficulties and high extra cost involved in increasing the height of the present stack, however, it is cheaper and, therefore, advisable to install a mechanical draft system. Let us say that in this plant we will use an induced-draft fan. This does not mean that we are not going to have any stack at all. As a matter of fact, we have assumed that we will have a stack of sufficient height to take care of the draft required when the economizer is cut out. When the economizer is in operation it will be necessary to have this induced-draft fan to help the stack supply the proper draft.

$$\textit{Draft (in. water)} = H\left[\frac{7.64}{T_1} - \frac{7.95}{T_2}\right]$$

where

H = Height stack (ft.);
T_1 = Outside temperature (deg. F. abs.);
T_2 = Stack temperature (deg. F. abs.).

In order to calculate the height of stack necessary to supply the proper draft when the economizer is not operating, certain assumptions must be made in regard to the various draft losses. Thus,

Loss in furnace, in. water	0.10
Loss in boiler, in. water	0.30
Loss in flue and turns, in. water	0.15
Total, in. water	0.55

Besides these there is a stack loss which is generally considered as 20 per cent. of the whole. The whole loss, will, therefore, be $\frac{0.55}{0.80}$, or 0.688 in. water. Assume that the outside temperature averages about 70° F. In one of the early paragraphs we said that we would consider the stack temperature as 550° F. at the base. These assumptions enable us now to calculate the height of our stack.

$$0.688 = H\left[\frac{7.64}{460 + 70} - \frac{7.95}{460 + 550}\right]$$

Therefore,

$$H = 105\ ft.$$

The Flue-Gas Temperature Is Decreased

It is now time to investigate the drop in temperature of the flue gases due to the fact that they give up some of their heat to the feed water in the economizer. It is evident that the heat absorbed by the water per boiler hp.-hr. will be equal to that given up by the flue gases per boiler hp.-hr., assuming that there is no loss by radiation, etc.

The heat absorbed by the water per boiler hp.-hr. = 32.8 × 82.5 = 2710 B.t.u.

The heat given up by the gases per b.hp.-hr. = 20 × 3.55 × 0.25 × T.

Notice that we represent the fall in temperature of the flue gases by the symbol T. The specific heat of these gases is assumed as 0.25.

$$T = \frac{2710}{20 \times 3.55 \times 0.25} = 153^\circ\ F.$$

Hence, the temperature of the gases at the base of the stack when the economizer is in operation will be 550 — 153, or 397 deg. F. Allowing 10 deg. F. for loss by radiation, the stack temperature will average 387 deg. F. The

draft given by the 105-ft. stack will, then, be considerably less, as is shown below.

$$New\ draft = 105\left[\frac{7.64}{460+70} - \frac{7.95}{460+387}\right]$$

$$= 0.526\ in.\ water$$

Allowing for the added resistance of the economizer surface to the flow of the gases, the draft which ought to be supplied by the stack in order to obtain the proper rate of combustion is 0.688 + 0.150, or 0.838 in. water. As a matter of fact, it is not possible to supply more than 0.526 in. water with this stack when the economizer is running. For this reason, the difference between 0.838 and 0.526, or 0.312 in. water, must be made up by the induced-draft fan. This corresponds to a pressure of 1.62 lb. per sq.ft. Assume that the fan runs at 75 per cent. opening and that the mechanical efficiency under these conditions is 40 per cent. The horsepower of such a fan will be computed as follows:

$$Hp. = \frac{cu.ft.\ per\ min. \times pressure\ in\ lb.\ per\ sq.ft.}{33{,}000 \times efficiency}$$

The maximum weight of gas flowing per hour will be $3.55 \times 1000 \times 20 = 71{,}000$ lb. per hr. This weight corresponds roughly to 27,335 cu.ft. per min. Therefore, the maximum or installed horsepower of the fan will be,

$$Hp. = \frac{27{,}335 \times 1.62}{33{,}000 \times 0.40} = 3.35\ hp.\ about$$

This type and size of fan, together with its engine and air ducts, will cost, installed, about $335. A yearly charge must be made against this value to cover the interest on the investment, depreciation, maintenance, taxes, insurance, etc., amounting to about 15 per cent. The yearly overhead charge on the fan and equipment will then be 335×0.15, or $50.20.

The Cost of Operating the Draft Fan

It remains now for us to compute, or rather estimate, the cost of operating this added unit of equipment. This we shall proceed to do on the basis of the average horsepower of the fan for the year and not on the basis of the installed or rated capacity. The average weight of flue gases flowing per hour is found to be $3.55 \times 1000 \times 0.8 \times 20$, or 56,900. Expressed in cubic feet per min., this becomes 21,800. This, then, is the average volume of gas that the fan has to handle. The average horsepower is found to be, therefore,

$$Hp. = \frac{21{,}800 \times 1.62}{33{,}000 \times 0.40} = 2.675$$

If we allow a steam consumption of, say, 70 lb. per i.hp.-hr., the weight of steam necessary to operate this fan will be 70×2.675, or 187.3 lb. per hr. The weight of coal burned under the boiler per pound of steam generated is $\frac{3.55}{32.8} = 0.108$. The coal required per hr. to operate the fan will, therefore, be $187.3 \times 0.108 = 20.2$ lb. Expressed in tons per year this becomes $\frac{20.2 \times 3650}{2000} =$ 36.9 tons per year. The operating cost of the fan equipment may then be estimated in this manner:

36.9 tons @ $3	$110.70
Lubrication, etc.	2.21
Total	$112.91

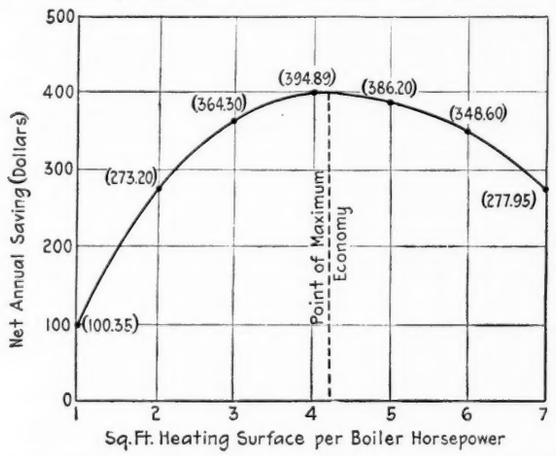
The various items of saving and expense may now be summed up as follows:

Item	Saving	Expense
Overhead Charges		
On first cost of economizer less saving in b.hp.	.....	$702.00
On first cost of fan and equipment	.....	50.20
Operating Charges		
Fan	.....	112.91
Saving on main units (fuel)	$1260.00	
	$1260.00	$865.11
	865.11	
Net annual saving	$394.89	

We may conclude, therefore, that, granting the assumptions that have been made, if we so select our economizer that the ratio of the square feet of heating surface to the boiler horsepower will be 1:4, the net annual saving will be approximately $400 as we have calculated. On the other hand, if we select our economizer of such a size that we get a different ratio, it is only reasonable to suspect that we shall obtain a different result as our annual net saving.

The Point of Maximum Economy

Furthermore, we are led to believe that there might, not necessarily must, be some definite ratio betwen these



Curve Showing Relation between Ratio of Economizer and Boiler Heating Surfaces and Net Annual Saving

two factors which would give a maximum annual net saving for the plant. This ratio would, of course, vary with different plants; but, for a given installation it would be fixed and constant.

This amounts to saying that, for a given plant, there is one and only one size of economizer which will give a maximum annual net saving. To prove this theory it is merely necessary to calculate the net saving for different selected values of this ratio and compare them. The results of such a calculation are shown in the following table:

Sq.Ft. per Boiler.Hp.	Temp. Rise	Fuel Saving	Expense Economizer (Overhead)	Expense Fan Overhead	Expense Fan Operation	Net Annual Saving
7	111.0	$1760	$1212	$65.25	$144.80	$277.95
6	103.3	1580	1036	60.70	134.70	348.60
5	93.7	1435	868	56.20	124.60	386.20
4	82.5	1260	702	50.20	112.91	394.89
3	68.7	1050	545	43.70	97.00	364.30
2	51.6	790	398	36.90	81.90	273.20
1	29.4	450	268	28.50	63.15	100.35

The results as tabulated above, show without a doubt that this theory is correct. If we take these results and plot the net annual savings as ordinates and the square feet of heating surface per boiler horsepower as abscissas a smooth curve is obtained as shown in Fig. 1. By inspection of this curve, it is evident that there is a maxi-

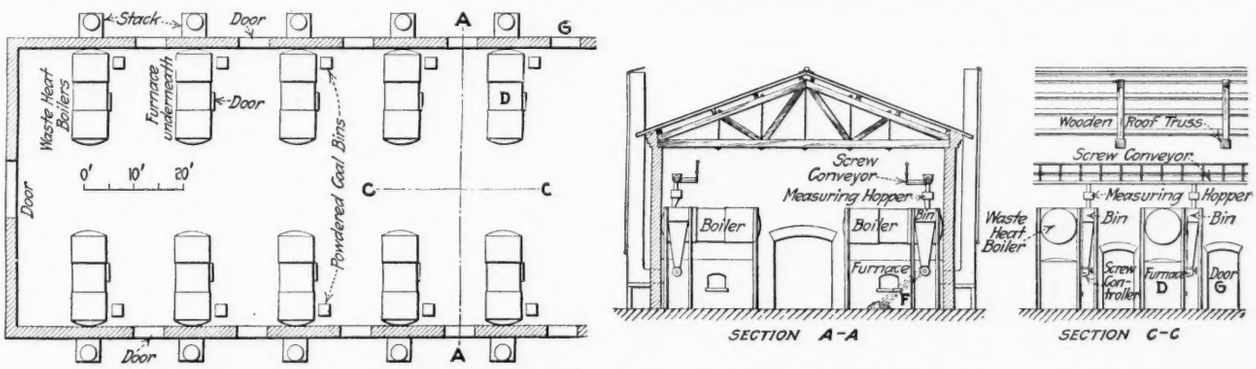
mum point at about 4.25 sq.ft. per boiler hp. This means that, if we select our economizer of such a size that there are 4.25 sq.ft. of heating surface for each boiler horsepower, we will obtain the highest possible annual net saving at this particular plant. In other words, in the case assumed our economizer should have 4250 sq.ft. of heating surface. Under these circumstances the maximum economy is obtained and, according to the curve, an annual net saving of $405 should be realized.

Powdered-Coal Fire at Burden Iron Works, Troy

On Mar. 18, at 10 p.m., a fire occurred in the puddling-furnace building of the Burden Iron Co., at South Troy, N. Y. This the newspapers erroneously called an explosion due to powdered coal.

There were about 80 puddling furnaces, and about one-fourth were using powdered coal as fuel. There was the usual milling plant, containing pulverizers, crushers, driers and the necessary bins and elevators. The pulverized coal was carried from the milling plant to the several furnaces by screw conveyors. At each puddling furnace there was a 1-ton steel bin with the requisite motor and controller to inject the fuel into the furnace.

The plant was running night and day, and the powdered-coal plant (furnished and erected by the Quigley Furnace & Foundry Co., of Springfield, Mass.) had been in operation since last fall. There had been the usual troubles with new machinery, but these had all been successfully overcome except one. The powdered coal persisted in caking in the bins, so that at times there was none flowing into the controller. This compelled constant hammering on the bins. Some became so battered that this hammering was forbidden by the management a week or so previously.



Arrangement of Powdered-Coal Furnaces at Burden Iron Works

On the night of the fire the operator at one furnace (*D* in the sketch) had removed the small slide from the foot of the hoppered steel bin, thinking, no doubt, that the coal would move more freely into the controller. But the coal dust was leaking out in small quantities upon the floor. There was a strong breeze blowing at the time, and as all the doors on the side walls were open, puffs of wind blew little clouds of this leaking coal dust in front of the furnace door (as at *F*). As the operator was pulling out a heat, with slag falling at his feet, the coal dust became ignited. Instantly, there was a flash and the flame darted upward into the roof trusses. These were wooden trusses with comparatively large surfaces, covered with fine coal dust which had settled there. The whole roof quickly became ablaze, and the men had to drop their tools and run for their lives.

The fire burned from 10 p.m. until 2 a.m., when the roof fell in on the furnaces. A part of the building had steel trusses and did not burn. The measuring hopper, screw conveyors and walkways came down with the roof, but there was no back-flash of coal dust through the conveyors, nor was there any explosion of coal dust. The destruction is to be charged to employees rather than to equipment.—*From Engineering News.*

West Virginia-Pittsburg Coal Co. Officials Confer

The "occasional conference" of the West Virginia-Pittsburg Coal Co. was held at the Hudson House, Wellsburg, W. Va., on Tuesday evening, Apr. 27, and was attended by all official employees of the Wellsburg and Collier mines of the company and also a number of the prominent citizens and coal men of the vicinity.

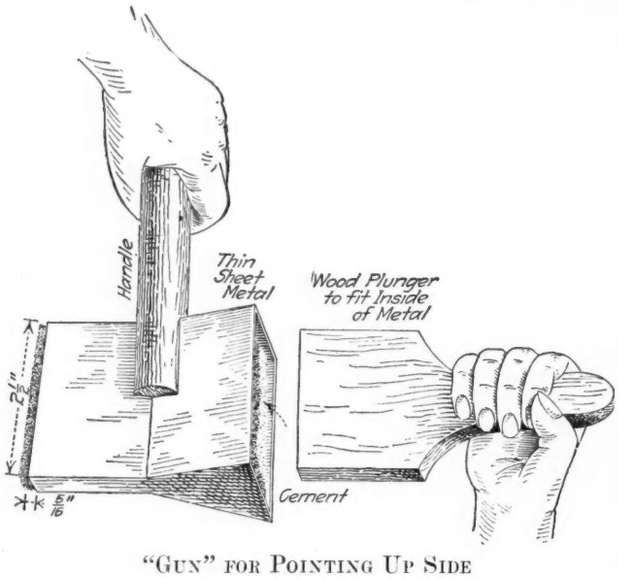
Among those present were several who were not employees of the company. Inspector Riggleman, of the First West Virginia Inspection District, spoke at length on the Safety First movement in West Virginia. He was followed by the Hon. Elmer Hough, who gave a brief history of Brooke County coal. Alexander Gilcrist told of his experience as a pioneer coal operator in Brooke County before the days of the Pan Handle R.R. Sheriff Patterson and Attorney Carter made interesting speeches. R. Z. Virgin, superintendent of No. 1 mine, spoke on "Mine Cars and Their Methods of Construction." S. M. McMahon spoke on "My Experience with the Shortwall Mining Machine." W. D. McCausland, general superintendent of the West Virginia-Pittsburg Coal Co., gave a brief outline of the extent of the company's coal-land holdings. Dr. Focer, company physician, spoke on "Sanitation in Mining Villages." L. H. McAmic, editor of the Wellsburg Herald, spoke on "How to Handle Coal Mine News." Captain Oakes of the steamer "J. O. Watson" spoke briefly on "River Traffic." Hefron Robison, general manager, acted as master of ceremonies.

At the close of the conference Samuel M. McMahon, superintendent No. 4 mine, making the presentation speech for the operating officials of the company (the speech being ably set forth in a poem written by Mr. McMahon, "The Humorous and Genial Scotchman"), presented a token of the esteem and appreciation in which Mr. Robison is held by his officials.

Boiler-Room Repairs

Most engineers and firemen are not very skillful in laying brick, says George C. Abbe in *Power,* but there are times when a few minutes spent in pointing up loose brick with cement or fireclay when the fires are out will develop a good job well done.

Getting fireclay or cement in between brick is not always as easy as it might seem. The illustration shows a sort of a square squirt gun with which you can fill up the



"GUN" FOR POINTING UP SIDE

most obstinate crack or hole, and you don't have to be a mason to do it either.

Always keep on hand a little cement, and whenever a crack shows up and needs attention it takes only a few minutes to fix it, and the job is better than that usually done with the time-honored trowel. Our original model was made from a small tin can and a piece of a barrel stave, which was used until worn out, when we had something suitable made by a tinsmith.

Coal Situation in Spain and Italy

Spain is rich in coal lands, says Consul Robertson Honey, of Madrid, in *Commerce Reports.* The area of carboniferous tracts approximates 4900 sq.mi., which is nearly double that of France and only one-third less than that of England. Of this area, however, only about one-fifth is worked—from which it is evident that the development of the coal industry in this country has not reached a high mark.

The causes for this lack of development are to be found in insufficient capital, high wages, high freight rates and the fact that many industries use electric current generated by water power. It has been estimated that the electric power employed in this manner would require 400,000 tons of coal annually for its generation, or between 5 and 6 per cent. of Spain's total consumption. The cost of hydro-electric power is about one-half that of the same amount of energy developed by use of coal.

English coal competes readily with the domestic and undersells it at seaports; only in the northern provinces of Spain, such as Asturias, where water transportation is available, can domestic coal meet the competition of English fuel. Thus it is that 60 per cent. of the domestic coal used in Spain is supplied by that province; on account of freight rates other provinces of Spain, quite as rich in coal as Asturias, consume their own output, but do not ship. In this situation are found the mines of Puertollano, Penarroya, Leon, Seville and Palencia. In 1913 (the latest year for which details are available), Asturias produced about 2,750,000 short tons of coal; Ciudad Real, 410,000; Andalusia, 387,000; Leon, 360,000; and the total for all Spain was approximately 4,161,500 tons, valued at $13,750,000.

During the past eight months imports of English coal have fallen off and the output of Spanish coal has increased 20 per cent., but the demand for foreign coal continues. Before the outbreak of the European war Spanish coal sold at wholesale for about $7 per short ton at the coal yard; the price now is $14.25. Similarly, freight rates by water from Gijon to Barcelona, for instance, have been raised from $1.60 to $4.50 per short ton. A leading wholesaler in Madrid states that eight months ago he sold English coal at 70 to 72 pesetas per metric ton of 2204.6 lb.; to-day he receives 100 pesetas (the silver peseta equals $0.205 at exchange of this date).

From the facts set out above, American coal exporters can make a rough estimate as to the availability of Spain as a market and can determine whether the question is worth taking up in detail. As of interest in this connection, the figures of Spain's imports of coal and coke in 1913 are given below:

	Coal		Coke	
Imported from	Tons	Value	Tons	Value
United States	37,250	$176,000	1,916	$12,200
Belgium	1,130	53,500	7,300	46,500
France	21,500	101,400	12,150	98,300
Germany	183,700	868,500	34,650	220,400
Netherlands	45,800	216,700	.....	.....
United Kingdom	2,682,000	12,680,000	360,000	2,230,000

(Prior to Apr. 7, 1915, foreign coal was subject to both an import duty and a transportation tax, but by a decree of that date these levies were suspended.)

Coal Mining on the Bonus System

In view of the animated discussions that have taken place in coal-mining circles in Britain with regard to the successful institution of a profit-sharing or bonus system in the coal-mining industry, it is interesting to get particulars of a system in vogue in Sardinia and which has been tested for some years. The mining business employs some thousands of men and has been based on the principle that those workmen who have been employed for a certain time are entitled to a share in the profits of the business and that capital has a right to its wages in the same way as labor has a right to its wages.

The workman receives a bonus in the wages earned by him during the year equivalent to the percentage paid to the shareholders above the rate fixed as the wages of capital, which may vary according to the nature of business. Thus assuming 5 per cent. as the wages of capital and 10 per cent. dividends to the shareholders, the bonus to which the workman would be entitled is 5 per cent. on the wages earned.

This bonus is not distributed, but is accumulated for him at 5-per cent. interest and cannot be withdrawn until

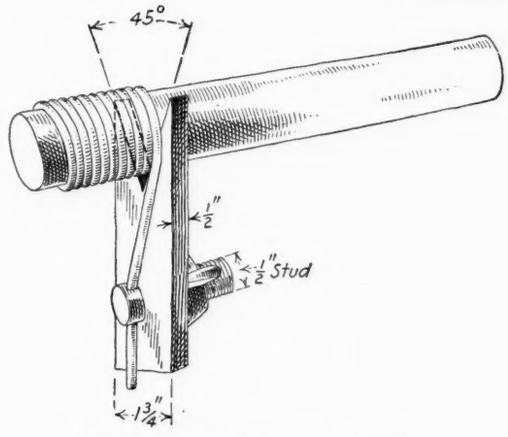
after he leaves the company's service. A modification has recently been introduced in the regulations governing the bonus scheme that constitutes a further step in the direction of labor copartnership.

When the capital standing to the credit of a workman reaches a certain sum it will receive interest at the same rate as the bonus in wages, with a minimum of 5 per cent. interest. This interest is paid out every year, instead of being passed as hitherto to the workman's credit. The effect of this provision is to make the workman a sort of preference shareholder.

The third and final step toward labor copartnership by which the workman as a shareholder acquires a voice in the management may come later on. Real progress toward the desired end can only be attained by gradual steps. The introduction of such a system in British and American mining companies could be done without negotiating with trade unions or consulting the men, and in it might be found a more real solution for the labor troubles which now seem to be so prevalent.

Spring-Winding Fixture

The illustration shows a spring-winding fixture, says F. L. Young in *Power*. Regardless of the diameter of the rod the spring is to be wound on, the tension is adjustable and the stress is taken up by the fixture itself.



POSITION OF FIXTURE IN USE

It is made from a piece of machine steel ½x1¾x14 in. long with a 45-deg. notch in the end, and drilled to receive a ½-in. stud and a standard ½-in. wing-nut. Drill a hole, say ¼ in., in the stud close up to the head, and the fixture is complete. To wind an open spring the tool is held in the tool post, getting the lead required by the lead screw, the same as for any other purpose. Closed springs are wound with the fixture held in the hand, and the wire will give its own lead.

Coal Trade at Palermo

The amount of coal received at Palermo annually, says Consul Samuel H. Shank, in *Commerce Reports,* is something over 200,000 tons. The greater part of it has come from England, being Cardiff and Newcastle coal. Small amounts were received from the United States in the past, but since the war commenced several cargoes of Pocahontas, New River and Fairmont coals have been imported. Some anthracite has been brought from Scotland, but thus far none from the United States. The demand for anthracite is steadily growing. There are no coal mines in the island of Sicily. The prices before the war compared with the present quotations, c.i.f. Palermo, are: Cardiff, usual price $6.08, present price $13.13; Newcastle, usual price $4.86, present price $11.55; anthracite, usual price $7.80, present price $14.60.

Coal received by dealers is stored in warehouses having a capacity of about 25,000 tons and located close to the docks. The state has a supply for the use of railways and mail boats, but this is piled in open yards at the docks and railway station. The government usually has about 15,000 tons on hand, and private stocks at present are probably somewhat smaller. It is estimated that there are 25,000 to 30,000 tons now on hand in Palermo. Coal is delivered to the ships in lighters of 8 tons' capacity, being passed in baskets by hand into the ship. No machinery is used. Usually four lighters and 40 to 50 men are employed. In 12 hours 300 tons can be loaded at a cost of 68c. a ton, laborers receiving 97c. a day.

Recent Legal Decisions

Liability for Freight Charges—A coal dock company does not become liable for freight charges on a shipment of coal merely through its receipt of the coal for storage and forwarding for the owner. (United States Circuit Court of Appeals, Eighth Circuit; Seither Transit Co. vs. Great Lakes Coal & Dock Co., 220 Federal Reporter 28.)

Employment of Minors; Liability Concerning Simple Appliances—When a coal operator employs a boy who is above the statutory age limit he is entitled to assume that the boy possesses the intelligence usually possessed by boys of the same age, so far as concerns the duty of instruction against dangers incident to his work. An employer is not liable for injury resulting from a defect in a simple appliance which could have been easily and speedily repaired by the injured employee. (West Virginia Supreme Court of Appeals, Martin vs. Carter Coal Co., 84 Southeastern Reporter 574.)

West Virginia Safety Requirements—Even if the West Virginia statute which requires elevators to be safeguarded to avoid injury to employees can be said to be applicable to mine cages, it cannot be construed as making a coal operator liable for injury to an employee working near the bottom of a shaft caused by fall of an object down the shaft while it was being loaded on a cage, due to space left between the platform and the edge of the shaft. The statute was designed only for the protection of employees while in or near elevators. (West Virginia Supreme Court of Appeals, Ferguson vs. Middle States Coal & Coke Co., 84 Southeastern Reporter 573.)

The Optimist

By WALT MASON

(Written expressly for "Coal Age")

The optimist is one who knows that life has many kinds of woes; he doesn't say, for our relief, that there is no such thing as grief. He doesn't whoop around and swear that there is no such thing as care.

The "sunshine" fakers talk that way, and bore the world from day to day.

The optimist who saws the wood knows life has much that isn't good; he doesn't fool himself with bunk, nor try to gold-plate pewter junk; he doesn't say that black is white, or see a dozen moons at night. He sees conditions as they are, yet ties his wagon to a star.

Progressiveness his watchword is; it animates his life and biz. If times are dull and business slack, he doesn't weep and wail, "Alack!" His mind is stored with useful facts which help and guide him in his acts, and so he knows just what to do, to keep his trade from falling through. A hundred useful hints he's read, and he has kept them in his head, and he can draw on that supply when business seems to wish to die.

For knowledge is the stuff that wins; it beats all optimistic grins. Most any gent can smile and smile, when things jog on in splendid style; most any gent can sing and dance when he has roubles in his pants; but when all things are going wrong, the unread critter cans his song, and pulls his hair and wags his ears, and says this is a vale of tears.

When things are going doubly wrong, the optimist then looms up strong—the optimist who stores his mind with all the knowledge he can find.

The Labor Situation

SYNOPSIS—The ending of the strike in eastern Ohio does not insure the immediate reopening of all the mines, as the coal has partly lost its market during the long strike. The Federation of Labor in Colorado protests against the conviction of Lawson. The Industrial Relations Commission publishes the Rockefeller-Lee correspondence.

The ratification of the new wage scale by the joint committee of operators and miners representing the eastern Ohio district and the signing on May 13 of the document by Charles J. Albasin, C. E. Maurer and S. H. Robbins, the former for the Union and the latter for the Pittsburgh Vein Operators Association, formally ends the 13½ months' strike in that coal region.

But in the meantime eastern Ohio operators have lost a portion of their market, and it is doubtful if they will ever be able to regain it. Despite the slack demand for coal some of the mines are being put in condition for operation. Others will not be opened until the operators see their way clear to sell their product. So the feeling in eastern Ohio is not one of elation, but rather of expectancy. The companies hope that something will be done this summer which will enable them to regain their lost position in the markets of the country.

Mines Will Be Inspected before Being Reopened

J. M. Roan, chief deputy of the Industrial Commission of Ohio and safety commissioner of mines, with his deputies started out in his mine-rescue car as soon as the agreement was ratified. They will inspect all the mines in eastern Ohio, and none will be allowed to start operation without the examination of the agents of the commission.

Last week it was said that the Moore's Run mine of the Hutchinson Coal Co. and several operations of the Youghiogheny and Ohio Coal Co., the Rail and River Coal Co. and the Pursglove-Maher Coal Co. were ready for reopening. Only a small percentage of the striking miners will be furnished work at this time.

The miners' representatives headed by Senator Green have appealed to the governor to veto the Gallagher amendment, but so far he has taken no action on the bill. The miners' officials threaten to defeat the amendment by a referendum vote in case the governor fails to veto it.

State Senator William Green, secretary-treasurer of the United Mine Workers of America, declared at Wheeling, W. Va., that the Industrial Workers of the World had been largely responsible for the delayed settlement of the eastern Ohio strike and condemned those who tried to belong both to the union and the I. W. W.

Colorado Federationists Bring Charges against Judge

The executive board of the Colorado State Federation of Labor has brought charges against Judge Granby Hillyer, who has just tried John R. Lawson, the international board member of the United Mine Workers of America in Colorado and Louis Zancannelli, a union miner. Both have been found guilty of murder.

The board alleges that excessive bail has been required and that trial has been denied except in a few instances. It states that the first jury was so in doubt as to the guilt of J. R. Lawson that 8 out of 12 voted for acquittal. Then the open venire system was followed and "notorious partisans of the coal companies were brought in as jurors. Coal company doctors and managers, kin-people of coal-company managers and men who had participated in battles with the striking miners were selected and before this jury Lawson and Zancannelli were convicted."

Alleges that a Company Attorney Was Specially Appointed

It is also asserted that the judge is a coal-company attorney and has been employed in cases against the miners. The executive board of the State Federation of Labor also states that a special act was passed by the legislature for the appointment of a judge in the district and that as a result the operators succeeded in getting their own attorney appointed. Affidavits were made setting up facts by which the judge was shown to be disqualified, according to the same board, but without causing him to withdraw.

The following statement is also made: "On the trials he refuses to permit jurors to be asked the question as to whether or not they could give the defendants the benefit of the rule of law which provides that a man accused of crime shall at the outset of the trial be presumed to be innocent. In one of the cases he even permitted a juror to serve who, according to the undisputed affidavits, had a gambling wager on the result of the verdict."

Correspondence between John D. Rockefeller, Jr., and Ivy L. Lee

On May 16 the United States Commission on Industrial Relations made public the correspondence between John D. Rockefeller, Jr., and Ivy L. Lee relative to a publicity campaign undertaken by Mr. Lee at Mr. Rockefeller's request. By this campaign it was hoped to put a more correct idea of the Colorado situation before the public than that which had hitherto been circulated.

In what has been published of these letters there is really nothing worthy of republication. Apparently Mr. Rockefeller sent Mr. Lee many letters and papers for his information in conducting the publicity campaign. In one letter he speaks of "an excellent article from the 'Coal Age' which outlines a plan for a broad educative campaign of publicity, such as you and I have talked of."

Mr. Rockefeller lent $2000 to Mr. Lee to assist him in his publicity work. This money was to be returned by Mr. Lee as soon as he began to receive checks from the Coal Operators' Committee.

Dates of First-Aid Meets

The following meets have been organized largely as a result of the energetic work of the American Mine Safety Association and the Bureau of Mines. Some, as will be noticed, have already been held.

Apr. 15, Fort Worth, Tex.
May 1, Butte, Mont.
May 1, Canton, Ill.
May 12-14, Huntington, W. Va.
May 14-15, Pineville, Ky.
May 18, Fort Smith, Ark.
May 22, McAlester, Okla.
May 25, Pittsburg, Kan.
May 29, Birmingham, Ala.
June 1, Moberly, Mo.
June 5, Des Moines, Iowa.
July 2-3, Big Stone Gap, Va.
July 23-24, Billings, Mont.

The American Mine Safety Association needs and should receive the financial support of all coal companies because of the valuable work it is doing to develop the first-aid and mine-rescue service of the country. It is at least entitled to have as members every coal corporation in the neighborhoods where it holds organized meets, and still more justified is it in anticipating that all the participant companies will assist by applying for membership. The fee is only $10 per year. Admission blanks can be obtained on application either to H. M. Wilson, secretary-treasurer, 40th and Butler St., Pittsburgh, Penn., or to COAL AGE, 36th St. and 10th Ave., New York City.

Coming Meetings

M. O. I. Coal Association annual meeting will be held June 22-25, 1915, at Cedar Point, Ohio. Secretary, B. F. Nigh, Cleveland.

Rocky Mountain Coal Mining Institute will hold its next meeting in Trinidad, Colo., June 8, 9 and 10. Secretary, F. W. Whiteside, Denver, Colo.

West Virginia Mining Institute will hold its summer meeting at Wheeling, W. Va., June 15 and 16. Secretary, E. N. Zern, Morgantown, W. Va.

The Mine Inspectors' Institute of the U. S. A. will hold its annual meeting June 8, 9, 10 and 11, 1915, at St. Louis, Mo. Secretary, J. W. Paul, Pittsburgh, Penn.

The American Society of Mechanical Engineers will hold its summer meeting at Buffalo, N. Y., June 22-25, 1915. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

The American Institute of Electrical Engineers will hold its annual convention June 29 to July 2, 1915, inclusive, at Deer Park, Md. Headquarters will be at the Deer Park Hotel. Secretary, F. L. Hutchinson, New York.

The Pennsylvania Retail Coal Merchants' Association will hold its 11th annual convention at Wilmington, Del., June 15, 16 and 17, 1915, with headquarters at the Hotel DuPont. The first two days of the convention will be devoted to business, including exhibition of coal-handling machinery in action, supplies and motor trucks. The U. S. Bureau of Mines will show by motion pictures every detail of anthracite mining, accompanied by a lecture by Charles Enzian, of Wilkes-Barre, Penn. The "Queen Anne" has been chartered to take the members and their friends on June 17 down Delaware Bay.

Editorials

A Great Opportunity, But--

Since Aug. 1, 1914, there has been a decided demand for American products in the markets of the world. This demand, so far as we are concerned, came without seeking or effort. As has been pointed out time and again in the public press, the present is a season of opportunity for American business unprecedented in the annals of history.

During the past few months American coal has found a ready market in countries which formerly used only European fuels. Italy, Spain, Egypt and the great republics of South America have made purchases of coal from this country where German and English fuel had been previously employed.

For obvious physical or rather geographic reasons it is to Brazil and Argentina that the United States may look with greatest hope for a foreign outlet for our surplus coal production. Both countries are rich naturally. Each produces a superabundance of many commodities which this country might well absorb. Wheat, beef, wool, goatskins, coffee, chocolate, sugar, rubber are but a few of the products of a soil of great fertility and a climate well adapted to their production.

It is useless for one people to attempt to trade with another unless there is a mutual interchange of commodities. Furthermore, in order to secure and maintain beneficial commercial relations each party should so far as possible cater to the needs and wishes of the other. The mine commissary manager who insists on keeping only the best grade of creamery butter when the miners and their families ask only for oleomargarine will soon discover that he has but few customers. In like manner it will be disadvantageous for American producers to ship run of mine and demand cash on presentation of bill of lading when prepared sizes and six months' credit are necessary in order to suit the customer's needs. American exporters and coal producers are "green" at meeting and filling the requirements of foreign consumers, and they might to advantage study well the needs and desires as well as the acknowledged necessities of prospective customers.

Of all phases of the situation, however, probably the most difficult to overcome immediately is the lack of adequate transportation facilities. With our coal mines idle or working on scant time, with many foreign countries anxious to secure American fuel and offering prices which would yield our producers handsome profits, we suffer from a lack of ships to transport our coal to foreign countries and bear back in return their products to our shores.

One hundred years ago or thereabouts, America in large measure monopolized the carrying trade of the world. Clipper-built ships, barks and schooners all flying the flag of the United States were to be found in all quarters of the globe, and the American merchant marine was the mightiest on earth. Today we as a nation are reaping a bitter harvest, the fruit of criminal shortsightedness on the part of our past lawmakers and so-called statesmen. The American merchant marine is, or at least was a few months ago, extinct so far as foreign freight is concerned.

The field of opportunity is ripe for the harvest. America lacks neither skill nor incentive to meet the occasion. Successful entrance into and the retention of any considerable portion of the world's fuel markets, however, would mean big business, and many of our people are obsessed with the idea that big business is "pizen." If this idea can be eradicated and our big coal-producing organizations allowed to enter the field untrammeled by petty legal restrictions and persecutions or the fear thereof, we as well as our customers in other lands may reap a lasting benefit.

Doing Less Than Nothing

Some men are so placed industrially that they tend to prevent and retard rather than to help in the performance of useful work. Those of our readers who were born in England will remember the man with a red flag who went ahead of traction engines to warn the vehicular traffic and help to control restive horses.

This yokel served admirably to prevent the development of the auto car and auto truck, for if the speed had to be kept down to suit the man's slow rate of travel, there could never be an economical operation of the motor truck.

But it seemed wiser to the British Parliament to require that the men be hired than that the farmers be asked to break the horses and make them tractable in the presence of steam-driven vehicles. Besides, who could foresee that trackless propulsion would reach its present stage, and had anyone foreseen it he would have schemed up a way by which such a dangerous hustling along public roads might be made illegal.

In Colorado there is a law requiring a boy or a man to be placed at every mine door. If these doors were made self-acting such an attendant could be dispensed with. But the law did not contemplate the introduction of such doors, and so the boy had to be employed. In no other state is there a provision requiring an attendant at all doors.

State Senator Tong, of Denver, drew up a bill making it possible to dispense with door-tenders when automatic doors were provided, and he presented it to the legislature in February of the present year, but no action has so far been taken. This bill should be passed, for the old law requires the mine to be worked inefficiently.

A man engaged in opening and closing a door is a lost economic unit till he is moved to some other place, whether he is a flunkey in a uniform or a less gorgeous individual sitting on a soapbox. We talk glibly about the conservation of human life. No one can better conserve it than by keeping it at useful labor and such labor only.

Where men work at an unnecessary occupation, not only do they degenerate mentally and morally, but they consume the product of real workers while they contribute nothing to the welfare of mankind. Many an individual of admirable qualities fills a useless office or none at all, and such men may well be said to be effecting less than nothing.

A door-tender is less reliable than an automatic door. He may leave it open or may fail to open it when such opening is necessary. He is as fallible as a signalman and may be even more likely to fail, for rarely are the better grade of men chosen for the work. Why, then, keep in operation a law by which his services are compulsory?

Uncertainties in Statistics

So few are the states that are securing statistics of the nationality of mine workers and such a considerable service is being rendered by those that are doing this work that criticism may well be avoided lest it discourage others from following such a worthy lead.

The men being enumerated cannot, for the most part, speak English, and some of them are not able to read or write. As a result it is hard to make clear to them whether a national, ethnological or linguistic statement is desired. In fact, is the inquirer himself quite clear as to the information he is seeking?

Some men, for instance, declare they are Poles. This may be true ethnographically, but it does not state whether they should be classed as inhabitants of Russia, Austria or Germany. Other Poles might say they were Russians, Austrians or Germans and thus muddle up the record if Poland were regarded as being of such ethnological importance that people of that race should be segregated in the record.

The Bohemians largely speak German, and as they are more friendly to Germany than to Austria, in many cases are likely to class themselves linguistically and by sympathy rather than nationally.

The only safe plan is to ask the man when employed what country he comes from and who is the ruler of the country. From his two answers it will be possible to tell his nationality without uncertainty. If it is desirable to divide the inhabitants of the British Empire into Englishmen, Scotchmen, Irishmen, Canadians, Australians and so forth, that can well be done because the inquirer will be dealing with clearly defined units. But any such attempt in central Europe will result in overlapping schedules and resultant uncertainty.

At best, however, our statistics will never be really accurate. It will be impossible to iron out the Balkan muddle. No man of Bulgarian race would declare he was a Serbian even if the Serbian ruler reigned over the village in which he was born. This is true of all Serbia, but especially of that area where the Serbians have recently dispossessed the Turks and annexed large numbers of Turkey's Bulgarian subjects.

The problem should be settled by some authority on European conditions when the present war is over and the national lines are newly defined. Then we may be saved from divisions like Horwat, Granish and Slavish, the former classes not having recognition in a dictionary and the latter being so large a term that it includes citizens of Russia, large parts of Austria, Serbia, Bulgaria, Montenegro, Turkey and Roumania.

How Coal Operators May Spend Their Money

We shall not discuss whether coal operators have money to spend. Profits are small; in many cases there are none, but the men who operate mines have money, whether they have made it in coal mining or in some other way.

Many of them are admirable citizens where they live, giving their money freely to every public work and trying to make their home towns desirable places for rich and poor to live in. But surely if they are bestowing their largess on any worthy object they may well spend much of it in making their coal towns desirable. If they are spending money, as many of them are, for the benefit of people who have no claim on them, why not spend some on the villages where they have a large responsibility, even if from the industries of those villages they do not receive a large return?

Just as Washington gives its millions for fine buildings and a magnificent station and then begrudges a country village a decent post-office, so a man will build a fine church or endow a splendid hospital in a city for people who never had any relations with him and will leave the village where his workmen live without any of the institutions which dignify life and remove suffering.

We are not concerned with the argument whether the man who mines coal or the man who buys it is most entitled to the bounty of the rich man who happens also to be a coal operator. The important question is, Why should his favors go to the city and few or none to the village, for if he has money to spare, it will go further in the mining camp than in the large city?

Doubtless no one will appear extremely grateful to him for his generosity should he give of his bounty to improve his mining towns, and some will say it was done to curry favor with the workingman or to increase efficiency or for any other reason than the true one—generosity; but the condition is similar in cities. In a large city there are like innuendoes wherewith it is customary to assail benefactors. In fact, wherever money is given, men of little mind who never parted with a penny without physical violence will invent a thousand reasons to explain away a generous instinct.

It was Ruskin who said that the architects of earlier centuries spent as long and loving attention on the rear of the monastery as on its facade, and it would be well if we, today, tried to make a democracy of towns instead of having on the one hand magnificent cities and on the other villages that are no credit to us. Mining villages may never be stately and magnificent, but they can be sweet and dwellable; and with the delights of the country to aid the human comforts provided, the village may be made more attractive than the city.

Can Someone Enlighten Mr. Le Baron?

The manager of COAL AGE, William Le Baron, has asked the editorial staff why it is necessary for the coal industry to be always in a strike turmoil.

The editors unfeelingly declared the question extremely stupid, but finally offered to put the query to the readers of the paper. They may, in their united wisdom, be able to answer it. The editors cannot.

Sociological Department

The Short-Cut to Safety First

By C. Rae King*

SYNOPSIS—Though many accidents will still occur to temperate men, yet the Safety-First movement will never attain its greatest efficiency till men working in and around the mines reduce their consumption of alcohol. No propaganda for safety are complete till a temperance movement is made a part of the attempted reform.

Mining journals for the past year or so have been well filled with articles telling us about "safety first"—how to elevate the foreigner by welfare work and how to reduce accidental suffering by first aid. Many of these articles have been descriptive of methods so expensive and elaborate as to be out of the reach of the smaller coal-mining corporations.

Moreover, while many of the safety, welfare and first-aid plans have been carried out with more or less success, in most cases the workers in charge have failed to realize that so long as the managements of coal companies, particularly of those which own their own towns, permit the unrestricted sale of liquor to the workmen in their employ, welfare work is being undermined, first-aid treatment made more necessary and safety is put last instead of first.

Legitimate Merchandise Excluded and Yet We Fear to Restrict a Dangerous Trade

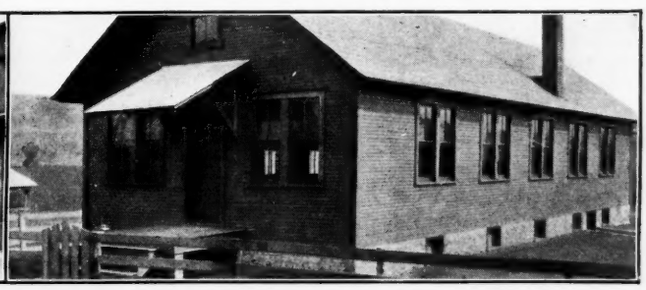
The question promptly arises, Can this excessive distribution of liquor in mining towns be prevented? We smile at this question when we think how recently the common practice of coal companies was to keep all outside merchants dealing in the necessities of life from coming into their towns and selling to their workmen in competition with the company store. In fact, if I remember correctly, the practice was so unjust that legislation attempted to divorce the company store from the coal operation and thereby lift the embargo thus placed on the outside merchants. With this knowledge before us is it not reasonable to assume that, if it was possible to keep out those who sold necessities of life, it is now also feasible to exclude those who sell an article which puts life in jeopardy?

As a matter of fact the amount of intoxicating liquors furnished a mining town can be regulated if the management so desires. Of course, if any of the officials connected with the coal company have a pecuniary interest in the traffic the restriction becomes more difficult.

A Village Relieved of an Overload of Liquor Will Make Progress in Safety

We assume that it will be readily granted that if the overload of liquor furnished the foreigner—that is, the amount in excess of what is "enough" (which of course will vary with each individual's point of view on the liquor question)—was kept out of the mining communities, the too frequent murders, riots and accidents would proportionately decrease, and immorality and uncleanliness largely disappear. Let us also admit, for the sake of argument, that under these improved conditions welfare work would find a more fertile soil in which to develop.

A Street in Greenwald with Concrete Ditches



Hall of the Greenwald Temperance Society

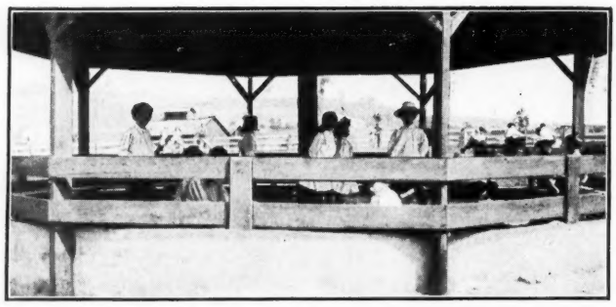
The necessity for first aid would be lessened, as some causes of accidents and sickness would be at least partly eliminated, and safety first would become a reality.

Let us be honest and also admit that it stands to reason that if dealers in the necessities of life can be prevented from soliciting or trading in coal-mining towns, then agents, solicitors, representatives of the breweries, or whatever we may desire to call them in order to shade the law, may also be prevented from soliciting and otherwise promoting the liquor traffic in mining towns if we, as managers, so desire. We are all ready to admit freely that if this could be done it would result in conditions such as we have long sought in vain.

We hear some coal operator arise and protest in a loud voice that " 'it can't be did,' that the labor situation would not permit of any such action, and that the foreigners, in spite of all which any coal-company management can do, will not stay where they cannot have their intoxicating drinks"—also, I may add, their murders and riots. Just as the coal operator makes this profound observation the advocate of personal liberty makes a loud noise and says, "Amen."

To all those who believe that the alcoholic curse cannot be controlled the following method is submitted, with

*Mining superintendent, Donahoe Coke Co., Greenwald, Penn.



EVEN WHEN IT IS WET THE CHILDREN CAN PLAY IN OPEN AIR AND WITHOUT ANNOYING PARENTS

the assurance that if it is liberally and consistently applied it will make possible that which they believe cannot be done and will make efforts in welfare, safety and first aid more worth while.

HIRE YOUR OWN LIQUOR AGENT AND MAKE IT WORTH HIS WHILE TO RESTRICT SALES

Select one of your trusted workmen—one who is willing to take the regulation temperance pledge, minus the "touch and handle"—and have him act as the brewers' representative or agent. This will only interfere with his regular work for one-half day each week.

He assumes this responsibility with the direct understanding that he is employed by the brewery, but as the wages paid him by the coal company are to increase as the quantity of intoxicating liquors consumed in the town decreases, and as from the first the wages he receives from the coal company are to be increased over what they formerly were, he agrees to donate to a temperance society all the salary or commissions he may receive from the liquor interests.

After you have secured control of the liquor agent, keep all the other salesmen of intoxicating beverages out of your town just as you used to expel the other agents or possibly as you are even now excluding the hucksters and peddlers. Have the agent in your control furnish you

CHILDREN'S PLAYGROUND AT GREENWALD, PENN.

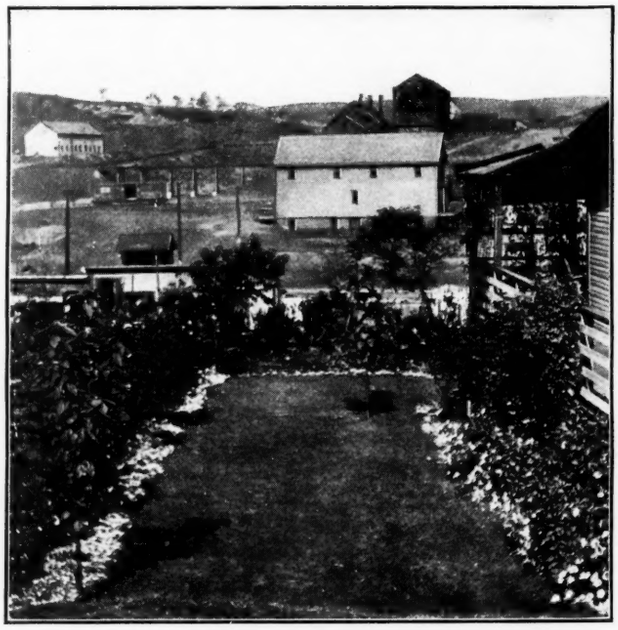
with a record of the liquor ordered by each house for the week, and you will then be in a position to regulate the amount of liquor going into your town.

See that the agent obeys the law. Require of him that he "gather up" the orders on a certain day of the week and at a time when the men are working. Thus he will obtain his requisition from the women. He must refuse orders from anyone who is not a renter.

TEMPERANCE CLUBHOUSE, SUPPORTED BY LIQUOR AGENT

Have a building constructed, if you do not have one, measuring say 24x75 ft., with a basement of the same size. Heat and light it, put in hot and cold water, baths, showers, etc., and then send out word to your employees that the building will be turned over to a temperance society for its exclusive use, provided it can secure a charter membership of at least 25 men and will operate the building under rules and regulations satisfactory to the company. The building and all its equipment will be free to the members of the society.

Also circulate the information widely that the society will not be without funds as the liquor agent has stated that he will donate all his liquor commissions or salary to the cause. After the society has been formed and is in operation, the agent voluntarily donates his liquor commissions or salary, and with these funds the society furnishes its rooms with pool and billiard tables, music, bowling alleys, card and reading tables and other forms of innocent amusement. It also proceeds to prepare articles of incorporation and to secure a charter.



A GREENWALD GARDEN WITH THE MINING PLANT IN THE REAR

The membership will grow rapidly; your employees will have a free place of recreation; the agent will be satisfied as he watches the liquor business decrease and his wages grow larger; the foreigners will associate with your better class of Americans, will absorb their ways, learn their language and methods, and greatly improve themselves in every way. The wives and children will be happy because "dad" has cut out the "booze" and begun to save money.

His associates will be of a better class, and it will soon be apparent that his supply of profanity and vulgar talk is decreasing and that he is becoming a cleaner and better man and also a more desirable workman. Each member becomes a personal worker for temperance in your town, and you will soon find that this temperance society will develop into a self-running machine, separating the lump from the slack among your employees. Once in motion it is automatic, managed directly by the better class of workingmen and lubricated indirectly by liquor money.

PLAN WILL STAND THE TEST OF THE COURTS

Some ask if this plan will not conflict with the liquor laws. No, it will not. All you have to do is to follow

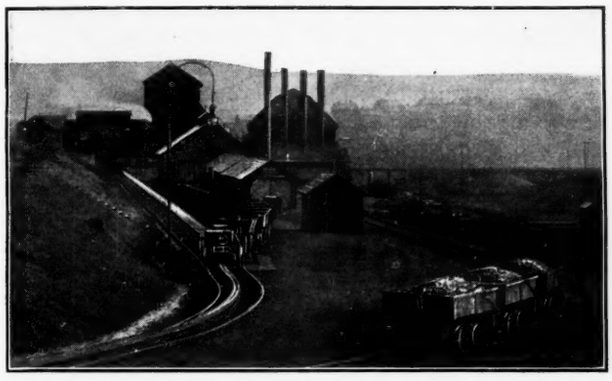
the methods of the liquor interests; let them find the way—and you can rest assured that they will. Even though there were a shade of doubt, would it not make an interesting case to observe the commonwealth prosecuting a temperance society for violating the liquor laws, having as its sole evidence that the system had reduced sales?

The next question comes from the "dollar and cent" man. He wants to know where the company comes in? How will it be reimbursed for the extra wages it pays the workman who acts as the liquor representative and for the temperance hall and other expenses in connection with the same? This reimbursement cannot be proved on paper in dollars and cents, but anyone who has ever been closely connected with the management of a coal company and mining town would not ask such a foolish question. Sober and industrious workmen mean prosperity and wealth.

The following are the rules which have been adopted by one such society and are given at length as a sample from which a draft of rules can be made to suit the requirements of any particular plant.

Rules Regulating Greenwald Temperance Society

The purpose of the Greenwald Temperance Society is to encourage temperance among the workmen of the Donohoe Coke Co. and to oppose all influences tending to promote or create intemperance, also to provide a place for social gatherings, recreation and amusement, and to create a moral atmosphere tending toward the elevation and bettering of the members.



Donahoe Mine Near Greensburg, Penn.

Election of New Members

To become a member of this organization it shall be necessary, in addition to the other requirements herein stated, that the applicant shall be over 18 years of age, of good character and have taken a pledge before a priest, notary public or justice of the peace to abstain from the use of intoxicating liquors for a period of one year. This pledge, together with a deposit of $5 as additional evidence of good faith, shall be presented to the secretary of the society, who will provide the new member with a membership card entitling him to all the privileges of the association.

Previous to the pledge and deposit a vote shall be taken on the application at a regular meeting of the society. Any candidate receiving over five black balls shall not be eligible to membership. In the event of his election he shall continue to be a member so long as he violates no pledge and is not for other causes, as herein provided, removed by the society or its official board.

Withdrawal and Expulsion from Membership

In the event that any member in good standing for any reason wishes to withdraw from the society he may so notify the president, who at a regular meeting of the official board, shall secure his money deposit for the member.

When any member is removed from membership he shall forfeit the money he has deposited. He cannot apply for reinstatement within a period of one month and shall pursue the same course as a new member, except that he shall be required to deposit $10 as evidence of good faith.

Only employees of the Donohoe Coke Co. or of John P. Donohoe & Co., Ltd., shall be eligible to office or membership. The following officials of the Donohoe Coke Co. shall be ineligible to office: The superintendent, mine foreman, chief engineer, coke-yard foreman and the chief clerk. An officer's term of service shall be one year unless terminated at an earlier date as herein provided.

The membership of any officer or member shall terminate at the time he leaves the employ of the Donohoe Coke Co. or of John P. Donohoe & Co., Ltd. Should an officer withdraw or be removed the vacancy shall be filled at the first regular meeting.

Duties of Officers

The officers of this society shall consist of a president, vice-president, secretary, treasurer and assistant secretary. They shall be elected by the members of the society at the regular annual meeting to be held on the first Monday of March of each year. Candidates receiving the highest number of votes shall be elected. All elections shall be by roll call.

The officers, in adition to their regular duties, shall act as a jury before which all cases, not otherwise provided for herein, shall be decided. Thus they shall place fines, provide for their collection, remove members for violation of their pledges, disorderly conduct or other causes herein stated and investigate charges made against any member. They shall have the power to summon before them any member for the purpose of obtaining evidence or information relative to the cases on trial or for the welfare of the organization.

A majority vote of the members of this board, which vote shall not be revealed to those not on the board, shall be final in all cases not otherwise provided herein. This official board shall hold its regular meetings on the second and fourth Mondays of each month.

Rules for Meetings

Standard parliamentary rules shall govern all meetings. Upon petition of 10 members the president shall call special meetings, the same to be well announced among the members. Upon petition of 10 members presented at a previous regular meeting a vote shall be taken for the removal of any officer. A two-thirds vote by roll call shall remove the officer from office and the vacancy shall be filled at the same regular meeting.

The regular meetings of the society shall be held at their rooms on the first and third Mondays of each month, beginning at 8 p.m. The meeting-rooms of this society are not to be kept open later than 10:30 o'clock on any evening other than Saturday; on Saturday evening they shall not remain open later than 11:30 o'clock.

The rules of this society shall not be changed or altered except by the consent of the Donohoe Coke Co. and a two-thirds vote of the members present at a regular meeting, notification of proposed changes having been given at the previous regular session.

Disciplinary Rules

No profane or obscene language will be permitted, nor gambling or rowdyism. Each offense, until more drastic action, which may be removal from membership, is taken by the official board, shall be penalized by a fine of 10c. for each offense, to be paid to the treasurer no later than the first regular meeting.

No one other than a member shall be permitted in the society's rooms except a visitor from out-of-town accompanied by a member who shall assume all responsibility for the visitor's behavior. The only exception to this rule shall be on special occasions after the society at a regular meeting so decides by a two-thirds vote. It may then, if permitted to do so by the Donohoe Coke Co., arrange to entertain its families and friends.

Breakage or damage of any equipment or furnishings or the meeting-rooms shall be paid for by the members responsible for same. No books, papers or any furnishings or equipment of any kind shall be taken from the rooms.

Provisions for Support

The building, with its heat, light and water and connections thereto, will be furnished without charge by the Donohoe Coke Co., and the amusements and fixtures will be donated by the welfare committee without charge. The use of the building and the equipment will be furnished to the Greenwald Temperance Society with the direct and positive understanding that it is to be used for no other purpose than that provided in the rules and regulations governing the society, and should it be used for other purposes not in accordance with the said rules and regulations or against the wishes of the Donohoe Coke Co., the latter reserves the right to close up the building without notice.

Discussion By Readers

Recognition of Bravery

Letter No. 14—I have been greatly interested in the discussion of the question of the recognition of bravery on the part of mine workers who attempt to rescue their fellows in peril. I was particularly impressed with Letter No. 13, COAL AGE, May 8, p. 819, by Sim. C. Reynolds, in which he refers to the sad death of his friend and companion, John Lyle, when they both risked their lives in the attempt to save others entombed in the fated Harwick mine, Jan. 29, 1904.

The incident calls to my mind a similar one in my own experience when a brave miner gave up his life in an effort to rescue two fellow-workers who had been entombed behind a heavy fall of roof. Although he was warned that it would be unsafe to attempt to reach the entombed men through the old abandoned workings that had been sealed off as they were full of blackdamp, he disregarded these admonitions, replying that God would be merciful to him in his attempt to save the lives of those in danger. His sacrifice was not without avail, however, as he succeeded in tearing down two brattices, which permitted fresh air to reach the men behind the fall and keep them alive until succor was afforded.

The sad sequel of this incident is that while one of the rescued men has since become wealthy, having quit mining and gone into a mercantile business, the wife and four children of the man to whom he owes his life are suffering today for the lack of support. It is sad to think that, while that man is living in comparative luxury, his brave rescuer lies in a grave unmarked save by a wooden slab and his poor family are deprived of the comforts of life.

I hope to see this discussion continued until some adequate and practical plan shall be developed whereby brave men who take chances and face death without a thought for their own safety will receive due recognition. The writer of Letter No. 12 suggested that such recognition should take the form of suitable mention in some good mining paper such as COAL AGE. This is very good and the idea of conferring a medal is well enough, except where the rescuer is incapacitated for work or loses his life in his attempt. It would seem then that there should be more adequate provision made—something that would be more practical and of greater assistance to those who have been deprived of their support.

I am inclined to believe that the state or national government might well establish a fund having for its purpose the support of the widows and orphans of these brave, big-hearted men who willingly give up their own lives in an attempt to save the lives of their fellows in peril. Attention has been drawn to the fact that such a provision for loved ones would relieve the mind of the rescuer and enable him to go forward with a braver heart and with greater assurance of success. The thought of the loved ones who would be left without his support is the one burden he now carries and which should be taken from him.

As I said before, I hope that the discussion of this question will continue and that we shall have one or two letters each week bearing on this matter, until some good is accomplished and effective means adopted that will greatly assist in the work of rescue.

OSTEL BULLOCK.

Cleaton, Ky.

The Mine-Car Question

Letter No. 1—I read with great interest the article by R. Z. Virgin, COAL AGE, May 1, p. 752, relating to the question of suitable mine cars. This is an important question, and I presume from the tone of the article that Mr. Virgin, like some of the rest of us, has been up against a serious proposition in that regard. Mr. Virgin's comments on the changes that have taken place in coal mining in this respect during the past few years are important, and coming from a man of his experience, cannot fail to attract the attention of all mine superintendents.

It frequently happens that mine managers and directors who are not personally acquainted with mining conditions often regard the suggestions of their superintendents as calling for improvements in equipment that are unnecessary. At times they may even conclude that owing to their lack of intimate knowledge of practical mining conditions they are being imposed on by the superintendent in charge who advocates such changes in equipment as Mr. Virgin has pointed out, as for example the adoption of a lighter and a cheaper mine car.

Recently I have advocated to the management of our company replacing the old style of cars now in use in our mines with modern, uptodate, roller-bearing cars of size and capacity suited to the seam that we are working. At the present time we have a 2-mi. haul underground, which will gradually increase as the mine develops. It is important that the cars should be built strong and durable to avoid the necessity of frequent repairs and the delays incident to breakdowns and wrecks that are unavoidable in the use of poor equipment. Such cars will also reduce the cost of operation, not only by reducing the power required for hauling, but by increasing the ease of handling the cars at the face.

My mining experience of 30 years in the coal fields of Alabama, Kentucky, Pennsylvania and Tennessee, which includes work in all the departments of mining and in all classes of mines, has taught me that it is economy to build a car suitable for the work and adapted to the size and nature of the seam and the haulage system employed. After 15 years of service as superintendent and engineer of mines I realize that this is a matter of more importance than is generally supposed by those not in touch with the daily operations underground.

All practical mining men realize that the further the mine workings advance into the mountain the more necessary it is to provide for an additional expense in relation to the haulage of coal, ventilation of the mine, upkeep of roads and airways, and drainage. More pumps and pipe lines, larger and heavier rails, more copper

wire and other items too numerous to mention are required because of the greater development of the mine.

Under these conditions, in order to maintain a low cost of production it is absolutely necessary to employ improved methods and equipment that will reduce the cost of operation as much as possible. An important factor in this consideration and by no means the least is the style, size and capacity of the mine car.

I hope to see this question thoroughly discussed in COAL AGE. I want to say that I have been greatly interested in the practical discussions that have taken place in this paper since its publication first began. I am personally acquainted with many of the men who have taken part in these discussions, but have refrained from doing so myself, which perhaps I should not have done.

P. F. LYNCH, Superintendent,
Cross Mountain Coal Co.

Briceville, Tenn.

Stopping Payroll Leaks

Letter No. 3—For a long time I have been an interested reader of COAL AGE. There have been many important things mentioned, but it seems to me there is not enough attention given to the small and apparently insignificant points in coal mining. Some time ago COAL AGE invited a discussion of the leaks that occur in coal company accounts, Vol. 6, p. 2. Since that time I only remember seeing two articles regarding the matter, and these both referred to the handling of the accounts by the mine foreman and the payroll clerk, but made no reference to the many leaks that occur through improper management of the work underground.

I want to call attention to a few of these small items, and while I do not claim that these are lost sight of by many mine foremen, I must say they are often neglected to a great degree. It is these *small* leaks underground that increase the cost of coal production.

On visiting many mines it is common to find a lack of proper drainage on the haulage roads. Almost every mine has some swamps and low places where water will accumulate unless a proper system of drainage is provided. I do not mean to say that mine officials generally do not understand the importance of keeping the roads well drained, but they allow this work to be set aside for more important matters.

I recall one instance of a mudhole on a motor road that lubricated the rails for a distance of ½ mi. and caused a loss of 10 min. in the time required to make a trip, besides necessitating the use of a half-bushel of good sand each day and the waste of much power. In addition to all this, the roadbed in such places becomes soft and requires much attention to keep the track in repair. I recall another instance where the tracklayer, upon starting to clean out a short drain, was called away to another job. Later, upon his return, he was obliged to put in two full shifts, lining and leveling the track under two 40-lb. switches from beneath which the motor had squeezed the fireclay. Had the drain been kept clear, this labor would have been saved.

Another trifling loss occurs through the frequent grounding of the electric wires carrying power into the mine. Any one of these grounds, taken singly, is hardly worth considering, but taken together, the loss is considerable, as shown by the ammeter.

Upon taking charge of a plant some time since my attention was drawn to the ammeter registering 75 amp., after the work in the mine had ceased. I first supposed that this was due to some pump in operation, but I found later that there was no machinery of this kind on the line. Investigation showed that about 25 of the trolley-wire hangers were grounded in the sandrock roof. When these were replaced with new hangers, the ammeter read zero after the cessation of work.

A simple calculation will show the loss from this leakage of 75 amp. under a pressure of 275 volts, being continuous for the time the switch on the supply current is open, which is 16 hr. a day. This loss in six months of 125 working-days of 16 hr. each, or say 2000 hr., would amount to $(75 \times 275 \times 2000) \div 1000 =$ 41,250 kw.-hr. At a cost of 2c. per kw-hr., the loss would be $41,250 \times 0.02 =$ \$825 in six months. In the present case, the loss being due to the leakage of current by the grounding of 25 trolley-wire hangers, the loss is $825 \div 25 =$ \$33 per hanger in six months, or \$5.50 per hanger per month—an amount that is almost inconceivable. However, it shows the importance of carefully testing an electric circuit for grounds and locating and stopping the leak. Besides this direct loss of current, there is the danger from fire where the hangers are in the coal roof or insulator pins are used instead in the entry ribs.

I do not want to convey the impression that a mine foreman, assistant or fireboss has overlooked these points where losses occur, but because I believe they are of sufficient importance to deserve prompt attention. It may be of even greater importance than the shooting of a hill or grading of a swamp to enable the motor to put out more coal in less time and with the use of less sand and less power, to say nothing of less wear and tear on the motor. These little leaks are of vastly more importance than the installation of an improved pump or motor to cut down the expense for power. As a rule, these larger jobs require very little thought on the part of the foreman, because they originate and are carried out by the men higher up. They assume the responsibility for these greater changes, but the mine foreman and his assistants must watch the small leaks that do not commonly show until the end of the year.

F. M.

Washington County, Pennsylvania.

Co-operation in Coal Industry

Letter No. 2—The question of coöperation on the part of all interested in the mining of coal is an important one. It has many sides, and there is as much need for co-operation underground in the actual mining of the coal as there is in the marketing of the product, which was referred to in COAL AGE, May 1, p. 777.

I attended a meeting not long ago that was called by a local union for the purpose of discussing with the mine officials the question of loading dirty coal in the mine. I was greatly surprised at the position taken by the men of this local. The company was represented in the meeting by the general superintendent, his assistant and the mine superintendent. Letters were read that had been received by the company complaining of the character of the coal as being "very dirty."

After the reading of these letters the officials talked to the men from a *practical* standpoint—not as a blacksmith

would attempt to tell a cobbler how to mend shoes. They showed the men that they had spent the greater part of their lives in the mining of coal and its preparation for the market. Their knowledge had been gained by practical experience. They made it clear that unless some measures could be adopted for putting out cleaner coal the company would soon be unable to operate its mines. It was proved by statistics that 95 per cent. of the men in the valley produced their coal by what is known as the "snubbing system."

In response to this appeal, however, no effort was made by the men or the officials of the union to remedy the trouble and coöperate with the officials in this matter, which was as much to their own interest as to that of the company.

To explain, the "snubbing system" of mining coal consisted in removing the binder that formed the lower layer of the coal seam, before attempting to shoot down the coal. The removal of this binder would permit the coal to be shot down more easily and allow it to roll over in readiness for being broken up for loading.

The "snubbing" also permits the miner to separate the binder from the coal in large slabs so that the coal loaded into the cars is much cleaner than it would be otherwise. When the binder is not thus removed before shooting the coal, it is practically impossible to clean the coal thoroughly as the binder is very simular in appearance to the coal.

Furthermore, to shoot the coal before removing the binder requires a heavier charge of powder, which breaks up the coal and makes much of it unfit for the market, besides creating a great quantity of fine coal and dust, which endangers the operation of the mine. If the charge of powder used is so small as to prevent the breaking up of the coal in this manner the result is what is termed a "standing shot." The miner must then undermine the shot and remove enough of the binder to permit the coal to fall or roll over. This not only requires much extra labor, but is dangerous, as the coal is liable at any moment to fall on the miner at work beneath.

When this matter had been presented to the men in a most friendly way, a few of them voiced the sentiments of the majority. One man said: "When you snub the coal, it just slips down before a shot can be fired, and it is hard then to roll it over. On the other hand, the shot does the work and throws out the coal ready for loading." This argument would seem to declare that a *square block* would roll over more readily than a *ball*. It may be asked, If this claim is true why have 95 per cent. of the miners in that vicinity used the snubbing system of mining the coal for 25 years and not discovered a better method?

Another man stated that before shooting his coal he "blocked it up with cap-pieces and ties." In other words, he practically closed up the space made by the machine, which had the same effect as "shooting the coal off the solid." The argument amounted to saying that in order to upset a house the first step would be to brace it with supports.

Another man said: "The dirty coal sent out is due to the method of distributing the cars in the mine. The turn of *two* men working in two places is seven cars having a capacity of 1½ tons each, while the turn of a *single* man is four cars, in an 8-hr. day." He did not attempt, however, to show in what manner this operated to produce the dirty coal.

This discussion was without any practical effect, as no attempt was made by the officials of the union to induce the men to load cleaner coal. In my opinion, the result was very discouraging to the officials of the company and showed a great lack of coöperation on the part of the men.

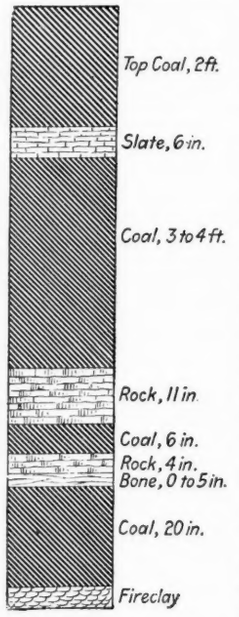
A TIMBERMAN.

Caldwell, Ohio.

Labor in Mining

I want to add a few comments, in connection with the labor trouble described in COAL AGE, Apr. 17, p. 687. Reference is there made to the demand for a reduction of 10 per cent. on all day labor and 5c. on each ton of coal at the No. 2 plant of the Atlantic Coal Co., near Meyersdale, Penn. I thought a few items would be of interest in this connection.

The mine is located in the Somerset County field, and the seam being worked is so close to the surface that there is no solid roof above the coal, as far as I could see.



In a few places there is a sandstone that comes in, but this has many cracks that make it dangerous when mining the coal. The accompanying sketch shows a vertical section of this seam. The 2 ft. of top coal is generally left in because it serves as a good roof while mining the coal in the middle seam. The middle seam of coal is from 3 to 4 ft. in thickness and has a high commercial value. The top coal can be taken down in some of the rooms, and this also has a good heating quality. These two seams of coal are separated by 6 in. of slate parting. Underlying the middle seam of coal is a 11-in. rock binder, beneath which is 6 in. of coal, then a second 4-in. binder underlaid with a seam of bony coal, varying from almost nothing to 5 in. in thickness. Below this is 20 in. of bottom coal, with 1 in. of bony in the center. The miner is compelled to shoot this bottom coal with dynamite, as powder becomes too wet before the shot is fired. This means 25c. extra for every shot fired at the bottom.

Owing to the bad roof, the miner is compelled to set crossbars at least 4 ft. apart. These crossbars are 10 ft. long and from 6 to 8 in. in thickness. It is necessary to set these crossbars in every working-place.

Six handpumps are used to drain the mine, which makes considerable water. The mine cars have a capacity of 2 tons each, and a 42-in. track-gage is used. Mules are employed for the gathering haul in the inside workings, while a gasoline locomotive hauls the cars from the inner parting to the mine entrance. On the outside a dinkey engine is used to haul the cars in 20-car trips from the mine to the tipple, a distance of about 3 miles.

The reader can judge for himself whether the company was justified, under these conditions, in demanding the reduction in wages paid for labor in the mine. Briefly stated, the facts are about as follows: The Atlantic Coal Co. paid its miners 60c. per ton for pick-mined coal and

50c. for each crossbar timber set in a room or heading. The working day was 10 hr. Tracklayers were paid $2.75, drivers and all inside laborers $2.50, while outside men received $2, and men working on the tipple $3 a day.

Last fall it was found to be necessary to reduce expenses in the mine. Accordingly, the price for setting crossbars was reduced to 25c., and all daymen were cut from 5 to 30c. a day. The result was a strike that lasted but a few days, when the men returned to work.

Again, last winter, owing to the low selling price of coal, another cut was made, and this time the price of mining was reduced 5c. a ton, but no cut was made in the wages for daymen. This caused dissatisfaction, and the miners came out, but returned after two days of idleness.

Following this, on Apr. 1, the president of the company, Frank Black, issued a notice of a still further reduction of 5c. per ton in the price of mining, making a total reduction of from 60 to 50c. per ton. A notice also stated that no payment would be made for crossbars in rooms, crossbars in headings remaining at 25c. each. All daymen suffered a 10-per cent. reduction, which made their wages $2.22½ inside and $1.80 outside the mine. As a result, all the miners came out on a strike.

I might add that the mine entries ran into a fault, which extends across the whole property. The company paid eight men good wages that ran from $2.45 to $3 a day to cut through this fault. All extras were furnished by the company.

Immediately following the strike, Mr. Black came down to the mine and held a brief conference, in which he stated that, were the company to pay the former wage scale, they would soon be in the sheriff's hands. The result was that many miners left the place, while the remainder returned to work.

Much credit is due Mr. Griffith, mine foreman and superintendent, who thoroughly understands general mine practice and is quick to adopt suitable methods in the operation of the mine. Many miners view conditions from their own standpoint and are prone to think that a company should not start to open a mine under the conditions they frequently find to exist in underground workings. They blame the company for not thoroughly prospecting the entire ground and preparing beforehand for the conditions that may be expected. Under the bad-roof conditions that exist in this mine, it would no doubt have been better to adopt a narrow track-gage and use smaller cars that one man could handle readily and that would have enabled them to do away with crossbars and eliminate that expense.

JOHN MAJER.

Garrett, Penn.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Causes of Mine Explosions—The causes of mine explosions may be generally stated as the ignition of gas or dust by one of the following causes:

1. By the use of **open lights** or **defective safety lamps** in mines where the air current is charged with gas or dust, or where gas has accumulated in void or abandoned places in sufficient quantities to be dangerous.
2. By the use of **mixed lights** in mines generating gas.
3. By the **inexperienced** or **careless use** of a safety lamp, or by **fooling** or **tampering** with the lamp, or **exposing it to gas** too long or to a **strong gas blower** or **strong current** or blast of air, or carrying **too high a flame.**
4. By the use of a **dirty lamp** or one that has been improperly assembled or injured by a fall or other accidental cause.
5. By the **explosion of powder** in blasting or the accidental explosion of a keg of powder, or the flame of a **blownout shot** or a **windy shot.**
6. By the use of matches or other means of lighting.
7. By the sparking of **electric wires, switches** or **brushes,** or the blowing out of an **electric fuse,** or the breaking of an **incandescent lamp.**
8. By the **spontaneous ignition** of oily waste carelessly thrown aside, or of fine coal or slack in the gob.
9. By the fall of certain hard roof **rock striking sparks,** as claimed in the Bellevue mine explosion (1910), Alberta, Can.
10. By the possible **generation of heat** due to concussion of the mine air in contracted workings in thin seams.

Prevention of Mine Explosions—No means has yet been devised that will insure absolute freedom from mine explosions. But the tendency to explosion and the frequency of these occurrences can and has been greatly reduced by studying their causes and adopting measures to remove them.

The following points are of chief importance:

1. Effective mine regulations and discipline.
2. Operation in accordance with the state mining law.
3. Enforcing by suitable penalties all mine regulations.
4. Thorough frequent inspection by competent men.
5. Education and training of all men employed in any capacity in the mine, in respect to the proper performance of their duties, the dangers to which they are exposed and the mining law and mine regulations in force.
6. Eternal vigilance of mine officials and a regard for safety greater than the desire for increasing the daily output of the mine.
7. Coöperation of employers and employed in increasing the safety of mine work.
8. Coöperation of all coal companies in respect to mining requirements.

Aside from the above general outline there is the necessity for each company to study carefully the conditions existing in its own mines, and to adopt a system of inspection and methods of ventilating the mine and mining and hauling the coal that will produce the best results and insure the greatest freedom from accumulations of gas and dust on the roads and in the workings. Immunity from explosion can only be secured by removing the cause.

The Coal Age Pocket Book

Mixed Lights in Mines—By "mixed lights" is meant the use of **open lights** in one or more sections of a mine in which gas is generated in other portions of the mine in sufficient quantity to require **safety lamps** being employed therein. The expression does not refer, however, to the use of open lights by drivers, triprunners or motormen whose duties are confined to the main intake haulage roads and shaft or slope bottom of a mine worked on safety lamps, provided there are lamp stations beyond which these men may not pass.

The use of mixed lights is a **dangerous practice.** The danger does not consist wholly in a man carrying an open light into the safety-lamp section, or to a foreman or fireboss forgetting that he has an open light on his head while carrying a "safety" at his side. These are possibilities that can be prevented by properly safeguarding the entrances to the gaseous section.

The real danger lies in a heavy fall of roof occurring in the safety-lamp section and driving out the gas into other parts of the mine where open lights are in use. Or, a squeeze may develop in any part of the mine and permit the gas to find its way without warning into an open-light section and cause an explosion.

Electric Mine Lamps—Any installation of electricity in a mine worked on safety lamps is necessarily accompanied with more or less danger. Whether the installation is for the purpose of lighting, hauling, coal cutting or drilling, pumping or ventilation, it should be made by a competent electrician. The entire system of wiring should be closely inspected at frequent intervals and tested to insure freedom from short-circuiting or grounding of the current, which are not only wasteful of power, but may start combustion and result in an explosion of gas.

The use of **incandescent lamps** in mines has become so common that the Bureau of Mines has made a careful investigation to determine their safety. Their experiments show that **ignition of gas** may follow the breaking of the glass bulb of a lamp in an explosive mixture. The experiments also seem to indicate that the liability of ignition increases with the cross-section of the filament of the lamp. In the breaking of an incandescent lamp **two conditions** may arise that materially affect the possibility of the ignition of the gas. The same blow that breaks the bulb may or may not break the filament.

The result in either case may be briefly explained as follows:

1. If the **filament is broken** and its parts do not short-circuit the current ignition of the gas is not likely to occur. If the broken parts, however, fall across each other in such manner as to again close the circuit their burning out in the air will generally ignite any gas present.
2. If the **filament remains intact** when the bulb is broken it will burn out more or less rapidly, according to the manner of fracture and consequent inrush of air and gas. A small hole due to the breaking of the tip may admit the air so slowly that the gas is consumed without explosive violence. In that case there may occur a slight explosion within the bulb, which is not broken but only pierced. This feeble explosion, however, is not communicated to the outside gas.

Inquiries of General Interest

The Mine Car Question

I want to ask if it would not be a good idea to discuss the conditions that determine the size and capacity of mine cars in American coal-mining practice. It seems to me this would form a very interesting question for discussion.

In visiting different mining camps one is impressed with the great variety of mine cars in use, differing in size, capacity and form. While these are for the most part the result of practical experience in the particular section or district where the cars are used, in many cases the cars are ill-adapted to the existing conditions, but have been adopted more or less blindly without regard to the actual requirements for the economical and safe operation of the mine in question. These cars are of all sorts and sizes, including the dilapitated "hay-racks" that scatter their contents from the coal face to the dump. Many are large and cumbersome, making it difficult for the miner to handle them at the face and resulting in an unnecessary loss of time and a consequent reduction in the output of coal.

Too often in adopting a form or style of mine car, little or no consideration has been given to the thickness of the seam and the nature of the roof and floor. These features, together with the general inclination of the seam and the method of mining employed, greatly modify the style of car that should be adopted in order to insure the economical operation of the mine and the greatest safety of the workmen.

Permit me to suggest that a practical discussion of this subject in respect to the style, size and capacity of cars and the advantages and disadvantages of different track-gages for use under different conditions, would be of the greatest interest to all practical mining men. In order to unify the ideas and suggestions that may be offered in such a discussion, I would further suggest considering three thicknesses of seam in level formations and on inclinations where the haulage roads have 5-per cent. and 10-per cent. grades, respectively, as indicated by the following table:

Thickness of Seam	Haulage Road
3 ft.	Level
6 ft.	Level
10 ft.	Level
3 ft.	5-per cent. grade
6 ft.	5-per cent. grade
10 ft.	5-per cent. grade
3 ft.	10-per cent. grade
6 ft.	10-per cent. grade
10 ft.	10-per cent. grade

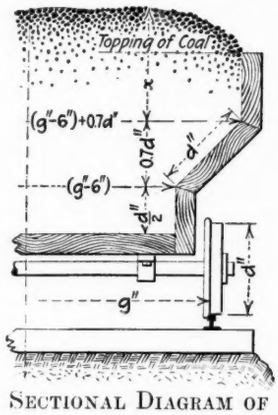
This will represent fairly well the different conditions under which cars must be handled in the mine. Reference should also be made to the character of the roof as being strong and permitting a good width of roadway, or frail and requiring a narrow track-gage and cars. While, as is well understood, a thin seam or a soft bottom that is liable to heave will often necessitate the adoption of a low car and the capacity must then depend on increasing the width and length of the car, it is also true that a frail roof will often require a narrower and longer car.

It would be interesting to know the size and capacity of the mine cars used in the longwall mines of Illinois and elsewhere, together with the thickness and inclination of the seam in each case.

SAMUEL DEAN, Mine Inspector,
The Victor American Fuel Co.

Delagua, Colo.

We are glad that Mr. Dean has drawn attention to this interesting question. His letter lays out a very simple, complete and practical plan. As a further suggestion that may assist those who will take part in the discussion and help to illustrate their ideas and make clear their meaning, we have prepared the accompanying figure or diagram illustrating one common style of mine car used in the bituminous region, in different sections of the country. In the figure, g = track gage; d = diameter of wheels and x is the vertical height of the coal above the spreading sides. The diagram is only suggestive, but enables the several dimensions of the car to be calculated for any capacity, track-gage and wheels. Assume a long ton of anthracite or a short ton of bituminous coal (mine run) occupies 1 cu.ft. Divide the desired tonnage capacity of the car by 40 to find the necessary cubic capacity. Assume a suitable inside length and calculate the other dimensions.



SECTIONAL DIAGRAM OF MINE CAR

Capacity of a Mine Locomotive

Is a 10-ton mine locomotive being operated at its full capacity or rating when drawing 150 amp. from a 250-volt circuit and running at a speed of only 6 mi. per hr.?

MOTORMAN.

Pittsburgh, Penn.

Before attempting to answer this question, it is well to estimate the power required to operate this locomotive at a speed of, say, 6 mi. per hr. (528 ft. per min.). Calling the coefficient of traction expressing the adhesion of the driving wheels to the rails 0.16, or say the tractive effort of the locomotive is one-sixth of the weight on the drivers, and taking the efficiency of the motors as 0.90, the current required to operate this locomotive at its full capacity at a speed of 6 mi. per hr. (528 ft. per min.) is

$$C = \frac{10 \times 2000}{6} \times \frac{528}{33{,}000} \times \frac{746}{0.90\ (250)} = \textit{say}\ 175\ \textit{amp.}$$

Therefore, since the question states that the motor is drawing only 150 amp., the locomotive is evidently not working at its full rating.

Examination Questions

Pennsylvania Anthracite Mine Inspectors' Examination, Held at Wilkes-Barre, Apr. 20-22, 1915

(*Selected Questions*)

Ques.—(a) How is the electric current generated before it is transmitted? (b) How is the transmitted electric power utilized? (c) Express the equivalent of 4.35 hp. in watts.

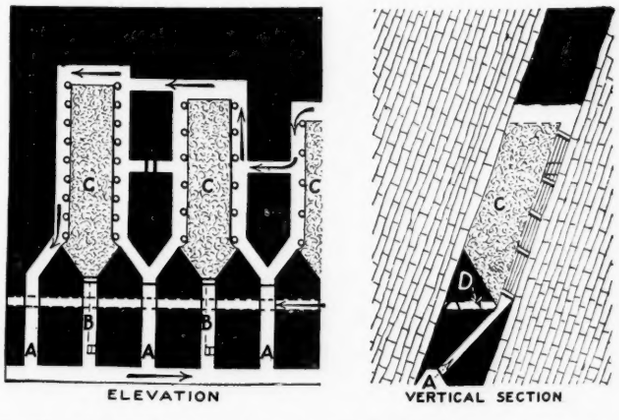
Ans.—(a) An electric current is generated at the power house by means of an electric dynamo called a "generator," which is driven by an engine at a very rapid rate. The rapid revolution of the armature of the dynamo between the poles of a magnet creates the current.

(b) The transmitted electric current is converted into mechanical power by an electric motor which is the same as the generator, except that the action is reversed, the current here acting to turn the armature.

(c) $4.35 \times 746 = 3245.1$ *watts.*

Ques.—When the chutes leading to the breasts pass under the airway, what is done to restore ventilation to the rest of the breasts, in case the manway is closed by a cave-in? Show by plan and section.

Ans.—In the mining of steep inclined seams in the anthracite region, it is customary to drive a crosscut from the manway up to the airway above, as shown in the accompanying vertical section at *D*. The airway is commonly called the "monkey airway." By this arrangement it is possible to short-circuit the air at any point by carrying it through the crosscut on the intake side of the fall and allowing it to pass through the monkey airway, returning to the breast beyond through the crosscut at that point. The air current is thus carried over the breast in which the fall took place.



Ques.—The airways in a certain mine are 10x10 ft. and the rubbing surface 39,000 sq.ft.; the quantity of air required, 200,000 cu.ft. per min. (a) State the pressure, in inches of water gage, using $k = 0.00000001$. (b) If the diameter of the fan is 15 ft. and the volumetric ratio 200 per cent., what is the width of the fan, and at what speed must it run? (c) What is the horsepower on the air, and what should be the horsepower of the engine if the former is 70 per cent. of the latter? (d) What is the mechanical efficiency of the fan? Assume the actual water gage to be 60 per cent. of the theoretical water gage and the weight of air to be 0.076 lb.

Ans.—(a) The first step in the solution is to find the water gage required to pass 200,000 cu.ft. per min. in this airway, which has a sectional area of $10 \times 10 = 100$ sq.ft. and a rubbing surface of 39,000 sq.ft.; thus,

$$W.g. = \frac{0.00000001 \times 39{,}000 \times 200{,}000^2}{5.2 \times 100^3} = 3 \text{ in.}$$

(b) Assuming, as stated in the question, that this actual gage on the air is 60 per cent. of the theoretical gage due to the action of the fan, the fan gage is $3 \div 0.60 = 5$ in. The peripheral speed, in feet per second, as calculated from this theoretical water gage, is

$$u = 47.25 \sqrt{w.g.} = 47.25 \sqrt{5} = 105.6 \text{ ft. per sec.}$$

The diameter of the fan being 15 ft., the speed in revolutions per minute is

$$n = \frac{105.6 \times 60}{3.1416 \times 15} = 134.5 \text{ r.p.m.}$$

The volume of the fan at this speed is

$$Vol. = 134.5\ (0.7854 \times 15^2)\ b = 23{,}770b \text{ cu.ft. per min.}$$

Now, assuming, according to the question, that the volume of air delivered is twice the volume of the fan, in cubic feet per minute (volumetric ratio, 200 per cent.) $200{,}000 = 2(23{,}770b)$; and for the width of the fan,

$$b = \frac{100{,}000}{23{,}770} = 4.27 \text{ ft., say } 4 \text{ ft. } 3 \text{ in.}$$

(c) The horsepower on the air in this circulation is

$$H = \frac{200{,}000 \times 3 \times 5.2}{33{,}000} = 94.5 \text{ hp.}$$

Assuming the general efficiency of the fan and engine as 70 per cent., according to the question, the horsepower required of the engine to drive this fan is $94.5 \div 0.70 = 135$ hp.

(d) It is impossible to calculate the mechanical efficiency of the fan alone, from the data given. The general efficiency in this question is assumed to be 70 per cent.

[The above question is a difficult one in examination, and the ability to answer such a question correctly does not prove the capability of the candidate to act as mine inspector. Further, the solution given above, which is the only one that can be applied to answer the question, involves a wrong principle in fan ventilation. Practically, there is no such thing as "volumetric ratio," as the volume of a fan, in cubic feet per minute, bears no fixed relation to its yield.

It is important to notice, also, that the water gage due to the peripheral speed of a fan is only realized when the mine potential is such as to develop that gage, allowing for the efficiency of the fan, which varies with the speed, but not in the same proportion.

As a matter of fact, a fan that will pass 200,000 cu.ft. of air per min. against a water gage of 3 in., at a speed of 134.5 r.p.m., would require to be 16.5 in. in diameter and 6 ft. 5 in. wide. The diameter of the double intake of this fan should be 10 ft. 3 in.—EDITOR.]

Coal and Coke News

Harrisburg, Penn.

At the hearing on May 11, before the Senate committee on corporations, J. H. Torrey, representing anthracite interests, asked that the workmen's compensation bills be so amended that the earning capacity of the miner would be based on the amount actually received by him after deductions for oil, squibs, powder, blacksmith work, etc., have been made.

He also asked the committee to restore to the bill provisions that would permit the coal companies to offer common law defenses in all actions for damages instituted by employees who elect not to accept the provisions of the proposed act. There is little chance of this change being made, in fact there is small prospect of the measure being changed to any great extent.

Various other amendments were offered by bituminous interests and manufacturers, such as limiting the total liability to $4000 on all claims, whether for total or partial disability; eliminating non resident foreigners from benefits; limiting the number of weeks under which employees could secure compensation to 400 instead of 500. It was also suggested that employees pay 10 per cent. of the insurance funds.

A striking phase of the compensation situation is, that the acts will not become effective until July 1, 1916, or only six months before the General Assembly of 1917 convenes. As originally drafted the bills were to go into effect Jan. 1, 1916, or 12 months before the convening of the Legislature. Somewhere along the line this very significant and important change was made in the bills. This feature, just discovered, may or it may not turn out to be a veritable snake.

With the new law in operation only 6 months before the Legislature meets, then with proposed amendments to the constitution approved by the people this fall, that Legislature can make the compensation act compulstory. Under the Constitution at present the bills cannot be made compulsory, only elective.

Another point is that the interim between July 1, 1916, and the convening of the Legislature of 1917, may be wholly consumed in litigation over the constitutionality of the bills about to be passed. In that event workmen's compensation may not become finally effective, irrespective of the action of this Legislature, until the Legislature of 1917 shall have passed new bills, in accordance with the terms of the Constitution as it is about to be amended. And these new bills may not be made effective until some time after the Legislature of 1917 shall have adjourned.

A Conference Committee Has Been Appointed

The Senate refused to concur in the amendment made by the House in Section 8 of the Catlin Bill No. 160, and the House and Senate have named a conference committee to consider the amendments. The committee comprises Senators, Beidleman, Catlin and Crow, and Representatives Powell, Schaeffer and Ramsey.

As this committee is composed of the men who have made the battle for the miners it is presumed by some that the latest move is engineered to put back into the measure some of the things that had been eliminated in the Senate Committee. It is likely that an agreement will be reached to make the bill effective next January, although it was agreed to have the bill become effective when the compensation bills went into operation, although the bill reads that it shall take effect immediately.

The victory of the miners in putting this bill which is of vital importance through both branches of the Legislature is the most complete achieved by the miners of the anthracite region in many years.

The bill as passed not only brings the men under the compensation act, but also defines the word "miner".

The bill as passed by both houses now reads:

Be it enacted that the act of 1901, etc. . . . . Section 1. It shall not be lawful, neither shall it be permitted for any person to act as mine foreman or assistant mine foreman of any coal mine or colliery unless he is registered as a holder of a certificate of qualification or service under this act, or unless in the judgment of the employer he is a person possessed of qualifications which make him equally competent to act in such position.

Section 6—No mine shall be operated for a longer period than 30 days without the supervision of a mine foreman. In case any mine is worked a longer period than 30 days without a mine foreman the owner, operator or superintendent thereof shall be subjected to a penalty of $20 per day for each day over the said 30 days during which the mine shall be operated.

Rule 1, The owner, operator and superintendent of a mine or colliery shall use every precaution to insure the safety of the workmen in all cases, whether provided for in this act or not and shall have supervision, direction and control of the mine foreman and all other employees.

Due notice of an intended inquest to be held by the coroner shall be given by the coroner to the inspector, and at any such inquest the mine inspector and any representative shall have the right to examine witnesses and read the law governing the case to the coroner's jury.

The mine foreman, assistant mine foreman, fire-boss and any person placed in charge of the works or any part thereof shall be the agent of the owners and operators and such owners and operators shall employ them and discharge them at will.

Article 18. . . . . The term "miner" means the person who cuts or blasts coal or rock at the face of a gangway, airway, breast, pillar or other working-place, also any person engaged at general work in a mine and qualified to do the work of a miner.

The bill introduced by Senator Crow, amending Rule 18, of the Bituminous Mine Code of 1911, and over which there has been considerable litigation, was signed on May 14, by the Governor. Rule No. 18 now reads:

In the cutting of clay veins, spars or faults in entries or other narrow workings going into the solid coal in mines wherein explosive gas is generated in dangerous quantities, a bore hole shall be kept not less than 3 ft. in advance of the face of the work or 3 ft. in advance of any shot hole drilled for a blast to be fired in.

A bill to regulate the use of safety lamps in certain bituminous coal mines and providing a penalty has been introduced by Senator Stewart and was referred to the Committee on Mines and Mining. The bill reads:

That on and after Apr. 1, 1916, it is unlawful to use in any bituminous coal mine generating explosive gases, and employing 10 men or more, any lamp other than a portable electric lamp of the style or type tested by the Federal Bureau of Mines and approved by the Pennsylvania Department of Mines.

An ordinary gas testing lamp known as a safety lamp may be used when approved by the Chief of the Department of Mines, only for the purposes of examining working places and for testing the gaseous conditions of air currents in the mine.

Each mine owner shall provide the employee in the mine with a portable electric lamp at or near the entrance of the mine when the workman reports for duty. Such portable electric lamp shall be in good operating condition and no repairs shall be made to a lamp, nor any adjustment made while the lamp is in the mine.

The bill carries a penalty of $25 for the first offense and $100 for the second offense.

A bill similar to this was introduced during the early part of the session, but the committee on Mines and Mining in the House reported to the Speaker with a negative recommendation, which killed it.

PENNSYLVANIA

Anthracite

Pittston—Two men were killed at the Barnum mine of the Erie Co. recently by a fall of rock, while two others were injured at the same time. The men were robbing pillars in the Checker Vein and the removal of the coal let down the roof.

Wilkes-Barre—The introduction of a new system of checking mine workers at Stanton and Empire collieries of the Lehigh and Wilkes-Barre Coal Co., as they enter and leave the mines, under which severe penalty is imposed should the mine workers lose their small brass checks, has resulted in a strike of about 1000 employees at these collieries. Final settlement of the grievance is being awaited with interest by mine workers of the Wyoming Valley as the dispute is a novel one and it is believed by many of the men that officials of other coal companies intend placing the brass check system in operation. The men allege it is an easy matter to lose a brass check, an occurrence which they claim in most cases is beyond a man's control. It is planned to take the case before the Conciliation Board.

Mauch Chunk—The strike of the Lehigh Canal boatmen employed by the Lehigh Coal and Navigation Co. is at an end and the men have gone back to work without receiving the increase of 10 cents per ton, which they demanded. Many of the men and their families lived in the boats, and as the company was about to sink the boats to prevent them from drying out, the men decided to go to work.

Shenandoah—The cylinder head of a 100-hp. hoisting engine blew out at the Lawrence Colliery, operated by the Maderia Hill Coal Co. recently. Three cars were pulled over the slope head, demolishing the structure and part of the engine house and all the electric wires, supplying power and light to Frackville, Girardville and Gilberton.

Carbondale—Eighteen hundred mine workers went on strike May 15, at the Coalbrook colliery of the Delaware & Hudson Co., because of a disagreement over a scale. The mine workers charge that the scales are in bad condition and that they have been losing credit for about 2000 tons of coal a day as the result. Operations at the Wilson Creek colliery are also halted as the coal from that mine is prepared for market at the Coalbrook breaker.

Bituminous

Uniontown—With all 400 ovens of W. J. Rainey's Allison plant in blast, 200 new ovens partly completed and an additional 200 just started, the indications for a return of good times with the Rainey interests at least are certainly the best. All the old ovens at the Allison plants are running full blast and have been for several days. The system at this plant is to add ovens as the mine develops and as a result additional ovens will be needed in the near future. Ninety-three of the new ovens are well under way and will be completed in August when it is expected that they will be fired immediately. One hundred and seven more are in process of construction and will be completed during the early part of 1916 while the 200 just started will be completed later in that year. The work of building these ovens is being done by the company under the supervision of J. H. Dunn, chief engineer at Allison. Eighty-two per cent. of the Rainey company's ovens throughout the region are now in operation and it is quite probable that this percentage will be increased within the next few weeks.

It is predicted that every available coke oven in Fayette County will be in full blast and that the coke plants will be working six days per week within a short time. The Pennsylvania R.R. is making arrangements to handle the heaviest traffic in years, and it is believed that barring war between Germany and the United States the coke region will see the greatest prosperity in its history.

Roscoe—Orders were recently issued closing down the Eclipse mine of the Pittsburgh Coal Co. indefinitely. The reason given is the low stage of water in the Ohio River, which prevents shipments. This is rather unusual for this time of the year. It is rumored that the Alice mine of the same company, located across the river from the first, may be closed down within a few days.

WEST VIRGINIA

Huntington—Permanent annual contests between expert mine rescue teams throughout this state and possibly including eastern Kentucky and parts of Ohio are planned for Huntington in connection with the annual fall festival. It is expected to conduct local elimination contests at mining centers throughout West Virginia, winners of which will come to Huntington every fall to compete for state honors and prizes. A day to be known as Mines and Mining Day will be set aside during the fall festival of each year, on which the contests will take place.

Bluefield—Coal shipments on the Norfolk & Western R.R. went over the two million ton mark in April for the first time since September of last year. These shipments put the business of the field back to normal, or almost normal, and it is expected that the output will continue to grow.

Moundsville—A force of men has been put at work by the Mound City Coal Co. making an excavation for an enlargement of the hoisting shaft at the Mound mine. This enlargement is made necessary in order that the company may increase the output of the mine. Some extensive repairs will also be made to cages and outside of the shaft. These improvements are only part of those contemplated in the future.

Charleston—Coal operators in West Virginia are handicapped as a result of a scarcity of miners, and it is believed that the eastern Ohio operators will have difficulty in manning their mines. Many mine workers are also wanted in eastern Kentucky, and field agents have been at work for some weeks trying to get men.

Grafton—The Maryland Coal Co. expects shortly to increase its operation to full capacity at the Wendel plant. About 800 men will be employed, and the output will be between 3000 and 4000 tons per day.

ALABAMA

Birmingham—Thousands of people participated in the celebration of the formal opening of Lock 17 on the Warrior River, recently. The opening of this lock gives the coal belt of the South an outlet to the sea. At a cost of $12,000,000 the river has been made navigable all the year around from Cordova to the Gulf. In the coal fields on the Warrior River, within three miles, it is estimated that there are 770,000,000 tons of workable coal available for barging down the river. Practically all of the coal of Jefferson, Tuscaloosa and Walker counties, which is about three-fourths of the total production of Alabama, may be shipped if desired by the Warrior River. Present freight rates on coal from Birmingham to New Orleans when coal is not for export use, is $1.10 per ton. It is estimated that the cost of barging coal down the Warrior from the mines will not exceed 50c. per ton. The Warrior is now the longest canalized river in the United States if not in the world. Lock 17 was built at the cost of $3,750,000. The dam raised the bed of the river 63 ft. and backs water of a minimum depth of 6 ft. at any period of the year as far north as Cordova. The work of construction was begun in December, 1911. The completion of this lock marks one of the greatest epochs in the industrial history of the state, and means more for the development of the vast resources of coal in the state than any other achievement in the history of Alabama.

KENTUCKY

Lothair—The Kentucky Jewel Coal Co. is now operating its mines full time—every day in the week. Orders from the Great Lakes region will keep them operating full time the remainder of the year. These mines are now shipping about 2000 tons daily; this is to be increased June 15.

Whitesburg—The Elkhorn Mining Corporation is preparing to resume its operations at Haymond on the Potters Fork branch of the Lexington & Eastern, after an idle period of six months or more. Much improvement is noted in the mining operations in this section.

Louisville—Kentucky operators having mines on the Louisville & Nashville R.R. as well as mines located suitably for water shipment, have been much interested in the statements in the papers to the effect that Spain wants coal and is preparing to guarantee payment for purchases made in this country. The mines on the L. & N., it is believed, can ship via Tampa and quote prices f.o.b. that port which will be attractive to the foreign consumers. At least operators are looking into the proposition, feeling that whether it proves practicable or not, the trade that may develop with Europe will divert other American coals from competitive markets.

OHIO

Martins Ferry—The Connor No. 2 mine of the Wheeling & Lake Erie Coal Co. at Connorsville is the first mine in the Belmont district to load coal following the 14-month strike. This mine employed 350 men when shut down, and only 50 men are now at work, but as soon as the mine can be gotten in condition, the full force will be employed.

Alexander Chimbrook sued the Youghiogheny & Ohio Coal Co. for $25,000 for injuries sustained in the mine. Before the suit was begun in Common Pleas Court, however, he agreed to accept $700 for the injuries sustained.

Athens—The Sunday Creek Coal Co., through J. H. Winder, general manager, has announced that it has purchased platform scales for all of its mines not heretofore equipped with them, in order to enable the weighing of coal at the bottom of the shafts as a temporary means of determining the run-of-mine weight of coal.

New Lexington—The announcement is made by the Peabody Coal Co. that it has abandoned operations at the Jobe mine, near New Lexington, Ohio. The equipment is being shipped to Illinois where the company is developing a large coal tract. When the mine is abandoned the switches will be removed. Fully 100 men have been thrown out of employment by the move.

Big Run—The Rail & River Mine No. 3 was recently inspected and found to be in first-class condition with the exception of a few minor falls and some repair work to be done in the bottom all of which may be completed within 10 days. It is believed that when this mine goes into operation again it will probably be the largest in the state. When in operation at full capacity it will employ about 500 loaders and 150 day men, and will have a daily output of 2500 to 3000 tons. It is believed that the company will later open a new shaft below Pipe Creek.

ILLINOIS

Coffeen—The Clover Leaf coal mine has closed down and will remain idle for possibly a month. It is said there is no market for lump coal, but slack can be sold in considerable

quantities. This mine has been running better than almost any other operation in this section of the state.

Belleville—Twenty-six coal mines located on the Illinois Central R.R. expect to sell their coal in St. Louis through a central selling agency. It is said that operators along other lines are organizing on the same general plan in order to stop ruinous competition. This will not materially change prices.

FOREIGN NEWS

Nanaimo, B. C.—Classes in first aid have been held during recent months at nearly all the coal-mining centers in British Columbia. While this is by no means a new departure in some parts of the province the movement has been more general lately than in other years. Doubtless this is in large measure due to the persistent interest taken in mine rescue training and first-aid instruction by the chief inspector of mines for the province, Thomas Graham, and the members of his staff. While not nearly all those who attend the classes for instruction afterwards present themselves for examination, a fair percentage of them do. During recent weeks examinations were held and passes made, as follows: Vancouver Island, at Ladysmith, 20 passed; Nicola Valley, at Merritt, 17; Crowsnest Pass, at Michel, 22. Other classes on Vancouver Island, and at Coal Creek and Fernie in the Crowsnest Pass district are yet to be examined. An effort will be made to send a first-aid team from Crowsnest district to participate in the first-aid competition at the Panama Pacific International Exposition at San Francisco, next September.

TRADE CATALOGS

The Turbo-Gear Co., Baltimore, Md. "The Turbo-Gear." Three pages 8½x11 in.; illustrated.

The Guarantee Construction Co., New York. "Retail Coal Pockets." Thirty-two pages, 6x9 in., illustrated.

Scranton Steam Pump Co., Scranton, Penn. Bulletin No. 101. "Duplex Piston Pumps." Illustrated, 16 pp., 6x9 in.

Mine Safety Appliance Co., Pittsburgh, Penn., "Koehler Safety Lamps." Twenty-three pages, 11½x8 in., illustrated.

The Lagonda Mfg. Co., Springfield, Ohio. Catalog W-1. "Lagonda Locomotive Arch Tube Cleaners." Illustrated, 12 pp., 6x9 in.

The Spray Engineering Co., Boston, Mass. "Sprays for Cooling Condensing Water." Fourteen pages, 6x9 in., illustrated.

The Standard Underground Cable Co., Pittsburgh, Penn. "Thirty-three years of Progress." Sixteen pages, 3½x6 in., illustrated.

The Link-Belt Co., Philadelphia, Chicago, Indianapolis. "Wagon and Truck Loaders." Forty-eight pages, 6x9 in.; illustrated.

Chicago Pneumatic Tool Co., Fisher Building, Chicago, Ill. "Class O Steam and Power Driven Compressors." Illustrated, 36 pp., 6x9 in.

The Hazard Manufacturing Co., Chicago, Pittsburgh, Wilkes-Barre, New York. "Wire Rope." Twelve pages, 3½x6 in., illustrated.

The Spray Engineering Co., Boston, Mass. "Washing and Cooling Air for Steam Turbine Generators." Eight pages, 6x9 in., illustrated.

The Perolin Co. of America, 1112-1132 West 37th Street, Chicago, Ill. "It Doesn't Affect the Water." Twelve pages, 4x8 in.; illustrated.

Fort Wayne Electric Works (Rock Drill Dept.) Madison, Wis. Bulletin No. 1143. "Electric Rock Drill, type A." Illustrated, 20 pp., 8½x11 in.

The Standard Underground Cable Co., Pittsburgh, Penn. Bulletin No. 201-1. "Standard C. C. C. Wire." Leaflet of four pages, 6x9 in., unillustrated.

The Jeffrey Mfg. Co., Columbus, Ohio. "General Catalog No. 83." Cloth bound volume of 384 pp., illustrating and describing the various products of the Jeffrey Mfg. Co.

Ingersoll-Rand Co., 11 Broadway, New York. Form No. 3015. "Portable Air Compressors." Illustrated, 32 pp., 6x9 in. Form No. 4032. Jackhamer mounting, type JM-6. Illustrated, 4 pp., 6x9 in.

PUBLICATIONS RECEIVED

Report of the Topographic and Geologic Survey Commission of Pennsylvania, 1913-14. Cloth bound volume of 232 pp., 6x9 in., illustrated.

University of Texas, Bureau of Economic Geology and Technology, "Potash in the Texas Permian," by J. A. Udden. Fifty-nine pages; 6x9 in.; illustrated.

Department of the Interior, U. S. Geological Survey; Bulletin 581-E. "The Coalville Coal Field, Utah," by Carroll H. Wegemann. One hundred and eighty-seven pages; 6x9 in.; illustrated.

Department of the Interior, U. S. Geological Survey; Water-supply paper 345-I. "Gazetteer of Surface Waters of Iowa," by W. G. Hoyt and H. J. Ryan. Fifty-six pages; 6x9 in.; unillustrated.

Department of the Interior, Bureau of Mines, Bulletin 80. "A Primer on Explosives for Metal Miners and Quarrymen," by Charles E. Munroe and Clarence Hall. One hundred and twenty-five pages; 6x9 in.; illustrated.

Geological Survey of Georgia, Bulletin No. 30. "A Preliminary Report on the Feldspar and Mica Deposits of Georgia," by S. L. Galpin. Cloth bound volume of 190 pages; 6½x10 in., with many illustrations, maps, etc.

Department of the Interior, U. S. Geological Survey; Bulletin 594. "Some Mining Districts in Northeastern California and Northwestern Nevada," by James M. Hill. Two hundred pages; 6x9 in.; illustrated.

Department of the Interior, U. S. Geological Survey; Water-supply paper 354. "Surface Water Supply of the United States, 1913, Part IV, St. Lawrence River Basin." One hundred and thirty-six pages; 6x9 in.; illustrated.

Illinois Coal Mining Investigations, State Geological Survey, Department of Mining Engineering, University of Illinois. Bulletin 10. "Coal Resources of District 1." By Gilbert H. Cady; 149 pp., 6x9 in., with many illustrations and maps.

Department of the Interior, U. S. Geological Survey; Water-supply paper 353. "Surface Water Supply of the United States 1913, Part III, Ohio River Basin," by A. H. Horton, W. E. Hall and H. J. Jackson. Two hundred and sixty-four pages; 6x9 in.; illustrated.

Department of the Interior, U. S. Geological Survey. "The Production of Spelter in the United States in 1914," by C. E. Siebenthal. Eight pp., 9x10½ in., unillustrated.

Department of the Interior, Bureau of Mines. Bulletin 88, Petroleum Technology 20. "The Condensation of Gasoline from Natural Gas." By Geo. A. Burrell, Frank M. Siebert, and G. G. Oberfell. One hundred and six pp., 6x9 in., illustrated.

PERSONALS

C. L. Scroggs, for many years commissioner of the Illinois Coal Operators Association, has been placed in charge of the Coal Mining Department of the Rockwood-Badgerow Co., general agents for the Travelers and the Aetna Accident & Liability Insurance Co.

James W. Eaton, mine foreman of Hecla No. 2 mine, Trauger, Penn., has been teaching mining school for the past 8 years, having 65 successful candidates for certificates as mine foreman and fireboss. Mr. Eaton's class of 1915 consisted of 10 students, of whom 8 were successful candidates.

A. H. Wood, of Petros, Tenn., president of the Petros Coal Mining Co., spent a few days recently in the Harlan, Ky., field on business connected with a new company he is organizing to develop a coal lease there. He was accompanied by parties who expect to become interested with him in the proposition.

Francis Glover, mining engineer of the Princeton Coal & Land Co., Princeton, B. C., has been appointed agent for the claim holders of the Roany placer claims situated between Princeton and Coalmont, B. C. The Lost Creek Mining Co. is operating this property. Chester Lee, mining engineer of Seattle, is engineer for this firm.

Patrick Hennessey, formerly superintendent of the Libby mine, has leased the C. A. Smith coal mine at Henryville, near Marshfield, Coos Bay, Ore., and 25 miners are now employed. Hennessey will market the coal in Marshfield and at Myrtle Point and in addition has a contract to supply the Smith-Powers logging locomotives operating in that district.

OBITUARY

Thomas Sweeney, 59 years old, a mine superintendent at the William Penn Colliery and a noted temperance advocate and member of many church and fraternal societies, died at Shenandoah, Penn., May 15.

H. J. McDermott, for many years chief shipping clerk of the Philadelphia & Reading Coal & Iron Co., died recently at his home in Philadelphia. His geniality and long familiarity with the anthracite business won him a host of friends, particularly throughout New England.

John Birkinbine, a noted mining and mechanical engineer, died recently at his home in Philadelphia at the age of 71 years. Mr. Birkinbine was consulted in many engneering problems throughout this country. He developed schemes for utilizing the water power at Niagara Falls, and devised the use of blast furnaces in the Lake Superior copper region. He was former president of the American Institute of Mining Engineers, and was for many years chairman of the Pennsylvania Water Supply Commission.

INDUSTRIAL NEWS

Portsmouth, Ohio—Ground has been broken for the first section of the new line to be built between Portsmouth and Columbus by the Chesapeake & Ohio R.R. Co.

Charleston, W. Va.—The Kanawha Mine Car Co., Charleston, W. Va., has changed its name to the Kanawha Mfg. Co. There will be no change in the policy or administration of the firm.

Birmingham, Ala.—It is stated that the American Steel & Wire Co. has a sufficient amount of orders on its books to provide for operations during the entire summer, and that probably operations will be increased.

Columbus, Ohio—Upon the application of Charles Cohenour, the receiver for the Maple-Gallia Coal Co., the receivership has been closed by Judge Rogers. The property in Athens and Vinton counties has been sold to a new concern.

Harrisburg, Penn.—Joint resolutions calling for an investigation by a State Commission of increases in prices of coal alleged to be in excess of the anthracite tax, were recently adopted in the House by a vote of 171 to 5. They have now gone to the Governor.

Greensburg, Penn.—Suit has been entered by the Girard Trust Co. of Philadelphia against the Bolivar Coal & Coke Co., to collect on a mortgage of $60,000 with interest from May 6, 1913. It is declared the company has mined coal but failed to pay the interest on the loan.

Wheeling, W. Va.—A number of mines will resume operations in the eastern Ohio field shortly. Among these will be the Roby-Somers, Purseglove and Gaylord mines, as well as many others. The majority of the operations will not be started, however, until on or about June 1.

Pittsburgh, Penn.—Work was recently begun on the United States Bureau of Mines building to be erected at Forbes and Boundary St. The building will be a three-story concrete structure and will be the first of its kind in the country. It is expected the work will be completed by June 1.

Bluefield, W. Va.—H. M. Waugh, of Orange, Va., has been awarded the contract for the construction of main line and side tracks to Leckie mine from the Williamson & Pond Creek Ry. The excavation is estimated to be 100,000 cu.yd. of steam shovel work. It is understood that this work will be begun at once.

Fayetteville, W. Va.—The coal loading for April in the Guyan district totaled 461,020 tons, a decrease of 22,675 tons for the month of March, and 34,530 tons less than the loadings for April of 1914. For the first four months of the current calendar year, however, 1,915,415 tons have been loaded as compared with 1,752,860 tons loaded within a similar period of last year, or an increase of 162,555 tons.

Bluefield, W. Va.—There was recently recorded in the county clerk's office a deed from the Burkes Garden Coal & Coke Co., to the United Pocahontas Coal Co., on which were placed $170.50 in war revenue stamps. This is one of the largest collection of stamps to be sent out from the county clerk's office since the war revenue was put in force, and seems to be a considerable sum to be paid when we are not at war with any country.

Coalwood, W. Va.—Geo. L. Carter, president of the Carter Coal Co., Coalwood, W. Va., recently awarded a contract to the Roberts & Schaefer Co., Chicago, for the complete designing and building of a large steel "Marcus" patent coal tipple, complete with screening and picking facilities and three "R and S" shaking loading booms, for installation at the large shaft mine recently sunk on the property of this company at Coalwood, W. Va. About $60,000 was involved in this contract.

Huntington, W. Va.—It appeared to be the consensus of opinion among about 20 operators from southwest West Virginia, assembled at the mine rescue and first-aid contest, that business conditions were showing remarkable evidences of resumption to normal conditions. Mines are opening up throughout the southern part of the state, and the operators agree that there are indications of a steady increase in the volume of tonnage and the amount of business in the coal regions of the state.

Mabscott, W. Va.—Through the medium of the Raleigh County Business Men's Association, the Carper Foundry & Machine Shop may soon be transformed into a manufacturing plant employing from 100 to 125 men. While this shop with its present capacity has never been anything but a repair shop, it is now planned to enlarge it for the manufacture of mine cars, fans, haulage equipment and all kinds of mine machinery for which there is considerable demand throughout the immediate vicinity.

Morgantown, W. Va.—The Roberts & Schaefer Co., Chicago, recently secured a contract from the Elkins Coal & Coke Co., Morgantown, W. Va. (J. B. Hanford, general superintendent), for the designing and building of a "Marcus" patent coal tipple with screening and picking facilities, and equipped with "R and S" patent shaking loading booms, for installation at Bretz, W. Va. This plant will be electrically operated throughout, and is the second structure installed by the Elkins company using horizontal screens.

Washington, D. C.—Notice was recently given by the Interstate Commerce Commission that it would begin upon its own motion an investigation into the rate, divisions, rules, regulations and practices governing the transportation of railroad fuel and other coal by rail originating on the Carolina, Clinchfield & Ohio Ry. in Virginia. The object of this investigation is for the purpose of issuing an order demanding that the roads, cease making rates, divisions and rules favoring coal and other fuel transported for carriers.

Birmingham, Ala.—The contract for the fourth unit of the coal washers of the Woodward Iron Co., was recently awarded through the General Machinery Co., to the Link Belt Co. of Chicago. The price for the fourth section is said to have been $30,000. It is said that when this fourth unit is added to the Woodward plant that the facilities there will be among the best and most capable in the United States. The washer will be of concrete and steel and the plant is expected to be ready for operation within the present year.

Uniontown, Penn.—Two hundred and fifty ovens were fired May 13 by the Consolidated Connellsville Coke Co., at Mt. Sterling and Grays Landing. This gave employment to about 300 men. The order for resumption followed the blowing in of a furnace in the Ohio Valley. The Consolidated Connellsville company has received an order from this furnace for 12,000 tons of coke per month for the remainder of the present year. The entire plant of 310 ovens at Mt. Sterling will be in operation and there will be 220 ovens at Grays Landing in blast. Both plants will be operated six days a week.

Uniontown, Penn.—Following all sorts of prosperity predictions emanating from various sources during the past few months, a published statement from F. P. Truesdale, division freight agent for the Pennsylvania R.R., states that tabulated statistics received at his office indicate that of all the steel mills in the United States 95 per cent. are in full blast with every reason to believe that within a short time operations will increase to 100 per cent. This statement, if true, means much to coal and coke operators and employees as the operation of these steel mills on such a scale means many increased orders for coke together with better prices.

New York, N. Y.—As a result of the absorption of the William A. Jepson Coal Co., of Boston, by the Skeele Coal Co., of New York, William A. Jepson will represent the latter company in the Eastern territory with the title of General New England Manager. He will have his headquarters at No. 85 Devonshire St., Boston. Mr. Jepson has been identified with the coal trade in and around Boston for upwards of 30 years and will no doubt make the New York company a big factor in the New England market. E. J. Skeele, president of the Skeele Coal Co., is the son of J. W. Skeele, for many years identified with the Lehigh Valley Coal Co. and later, until his death, president of the Lehigh Valley Coal Sales Co.

Coal Trade Reviews

General Review

Heavy curtailment by the anthracite companies. Effects of the increased export bituminous business felt in all sections but trade continues dull. Lake shipping increasing but still light.

A drastic curtailment program on the part of the leading hard coalers, the Lehigh Valley Coal Co. having suspended operations for an indefinite period, is the feature of the anthracite situation. The smaller dealers are apparently stocked up to the full limit of their storage capacity and the wholesale business will continue quiet until the consumers begin taking coal. While the combine is maintaining the regular company circular as rigidly as ever, the individuals are attempting to force business with heavy cuts, but with only indifferent success. The slowing up is characteristic of this season of the year, but it has attained to proportions entirely too large for comfort.

That the closest attention is being focused on the off shore export trade in all parts of the country is evidenced by the fact that reports from the Pittsburgh district are to the effect that foreign shipments are being made from that section in spite of its geographical handicap, while Chicago is getting scarcely any of the Pocahontas and New River grades, owing to the heavy demand at Seaboard. The rapid increase in this business is further indicated by the recent announcement of the leading ship brokerage firm to the effect that they are negotiating twice as many coal charters as in normal times. There is no doubt that the British embargo against coal exports from that country is proving a tremendous stimulant to our foreign trade.

Although Eastern bituminous prices are now steadier than for several months, internal consumption continues light and the current market discouragingly dull. There are still a good many large contracts to be closed but the heavy export demand is causing buyers to show more interest.

While Lake shipping from the Pittsburgh district is increasing steadily, the volume moving is still relatively small, and confined entirely to permanent consumers such as railroads; other consumers are still apparently drawing on their surplus stocks. While the regular circular on Lake coal is nominally maintained, it is understood in reliable quarters that substantial concessions can be obtained on large tonnages. The final arranging of the Ohio labor difficulties will no doubt see a heavy increase in the tonnage but the market situation continues quiet with prices maintained only with the greatest difficulty. Buyers are apparently convinced that they will be able to obtain cheap coal in the prompt market for some time to come, and few contracts are being closed.

Conservative interests in the Middle West regard the situation there as even worse, although there are many who believe that the present stagnation presages an active business after mid-summer. The heavy overstocks of Lake coal are exerting a particularly depressing effect on the market, but on the other hand the industrial situation is showing slightly more activity and a great deal is being anticipated from the various coöperative movements on foot to maintain prices.

BUSINESS OPINIONS

Business hesitating, pending diplomatic developments. Rumors of crop losses discounted. Iron trade apparently slowing down.

Financial Chronicle—Obviously, the occasion is not opportune for the rearing of bubbles of any kind, at a moment when the whole world appears to be becoming topsy-turvy, and no one can tell what startling thing is going to happen next and what far-reaching consequences it may involve. It is only proper to say, however, that ordinary financial and mercantile affairs are receiving very little attention for the time being, and scarcely any one cares a fig about what is happening on the Stock Exchange.

Modern Miller—Eight counties in southern Kansas report Hessian flies in considerable numbers, while their presence is not confined to these counties. Elsewhere they appear scattered, thus localizing their effect. It is impossible to measure the extent of damage which will not be fully apparent before June 1. Because of the big forecast of the Government, May 1, the scattered damage so far reported since then is minimized.

Boston News Bureau—At the moment, people are merely awaiting the outcome of the pending diplomatic negotiations. There is anxiety, but no fear. Money continues abundant and is still accumulating. We are increasing our foreign credits steadily. There have been some efforts to advance wheat prices by reports as to damage to the winter wheat by the Hessian fly. But the same reports were circulated at this time a year ago and yet we harvested a bumper crop.

Dry Goods Economist—The new international complications have had surprisingly little effect on the markets for dry goods and allied lines. In some quarters there are decided evidences of optimism.

Dun's—The developments of the week afford new proof of the essential stability and power of the financial and business structure. While there is uncertainty as to the final outcome, there is faith in the ability of the nation to adapt itself with financial readiness to every contingency that may arise. Outside of the stock, cotton, and other equally sensitive markets, the effect of the new war developments has not materially changed the generally favorable aspect of the trade situation.

Bradstreet's—Possible international political complications affect sentiment and prices in speculative markets, particularly securities, grain, and cotton, and perhaps throw shadows over optimistic expectations of a boom in trade, but thus far foreign developments have failed of especial untoward effect upon domestic trade or industry.

Iron and Steel—The feature of interest in the iron trade was the order placed by the Pennsylvania R.R. for 25 locomotives and the later announcement that contracts had actually been closed for 6400 cars. This interest is likewise figuring on about 30,000 tons of rails in addition to its order for 160,000 tons which will go to Eastern mills. In general, the iron trade has been dull and far less active than in several weeks. This extends through all branches of trade, and has been noted more especially in the pig iron market. A falling off in the demand for munitions of war is likewise observed, but this is of little consequence for the moment, for the orders placed within the last month have been of such magnitude that they taxed the capacity of the shops of the country.

ATLANTIC SEABOARD

BOSTON

Firmer tone in Pocahontas and New River, due to increased trade off-shore. Some small contracts closed recently, but still quite a tonnage to be covered. No change in Georges Creek or Pennsylvania grades. Water freights easy, with sail tonnage chartering off-shore. Anthracite shipments continue in fair volume.

Bituminous—Prices on the Hampton Roads coals are rather steadier than for several months. A better tone is observed, especially on f.o.b. business, and there is now practically no fear that prices will recede to any material extent so long as there continues a demand for export. The trade off-shore is in good shape. The volume of coal dumped at the piers is increasing and compared with a month ago there is much more inquiry. Coastwise, there is improvement in the contract demand but no spot business of any consequence has yet developed. At the same time, the agencies are encouraged over general prospects.

Only a few contracts have been closed the past week, and these practically all with private corporations. There is still some locomotive fuel to be bought, and at least one of the street railway systems is still holding aloof from the market. Some of the consumers who ordinarily take Georges Creek have been interested in getting covered in view of the volume of export business which the shippers of that grade have undertaken. The Pocahontas and New River shippers are still actively canvassing and it may be that some

of those who have stayed out of the market in the expectation of lower prices will be induced to close before many weeks. Prices at distributing points like Providence and Boston are somewhat higher.

Very little Georges Creek is available at any point other than Baltimore where there are still a number of foreign bottoms awaiting cargo. There is no change in the Pennsylvania grades. Prices are still at a minimum and so far as this market is concerned there is very little doing on coal of this character at Tidewater.

Water Freights remain easy at 70 to 75c., Hampton Roads to Boston, inquiry still being light. Sailing vessels continue chartering off-shore. Rates on anthracite barges from Philadelphia are 80c. to Boston points.

Anthracite—Domestic sizes are coming forward in fair volume. There were spells of adverse weather in April and that has carried the heavy shipping season farther into May than was anticipated. Most of the smaller dealers have now taken on liberal supplies and not much wholesale business is looked for until coal begins to move to the consumer. Meanwhile, some of the smaller New York shippers are striving hard to move their receipts at the loading ports.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.85@1.40	$1.20@1.60	$1.67@1.77	
Philadelphia*	2.10@2.65	2.45@2.85	2.92@3.02	
New York*	2.40@2.95	2.75@3.15	3.22@3.32	
Baltimore*	.....	.....	2.85@2.95	
Hampton Roads*	.....	.....	.....	$2.75@2.80
Boston†	.....	.....	.....	3.55@3.78
Providence†	.....	.....	.....	3.50@3.73

* F.o.b. †On cars.

NEW YORK

Slightly better tone to bituminous though conditions are still dull. Mines generally on half schedules except those in the export trade. Drastic curtailment in anthracite operations. Market heavy in all directions.

Bituminous—The bituminous coal market continues weak in many respects although there has been a slight improvement in the general tone. Operators have been curtailing production which has prevented over-stocking of the docks. This has prevented a slump in prices which would surely have come had the market been flooded. On the other hand there is plenty of coal on hand to meet all immediate demands.

The export situation continues to improve and inquiries are increasing. Although the order of the English government prohibiting the export of coal has been in force but a little more than a week, local exporters say the situation has improved considerably. One inquiry received this week was for 50,000 tons of high volatile coal. Exporters look for an increase in shipments to South American ports as well as to European countries. Bona fide inquiries have been received from Italy and France.

At the local harbor there has been a slight increase in demurrage coal nearly all in the cheaper grades. Shippers are having very little trouble with the better grades and little of these coals has been offered in spot sales. Line trade is fair. Some of the poorer grades were offered at $2.15.

Quotations on the various grades are as follows:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek	$3.00@3.10	$3.00@3.10	$3.00@3.10	$1.45@1.55
Clearfield:				
Medium	2.65@2.80	2.50@2.65	.....	1.10@1.25
Ordinary	2.45@2.55	2.40@2.50	.....	1.00@1.10
Broad Top Mountain				1.10@1.45
Cambria County:				
South Forks	2.90@3.05	.....	.....	1.35@1.50
Nanty Flo	2.75@2.80	.....	.....	1.20@1.25
Barnesboro	2.65@2.70	.....	.....	1.10@1.15
Somerset County:				
Quemahoning	.....	2.70@2.85	2.70@2.85	1.20@1.30
Medium	2.55@2.70	2.45@2.65	2.45@2.65	1.10@1.15
Latrobe	2.40@2.50	.....	.....	.90@1.00
Greensburg	2.60@2.70	.....	.....	.90@1.00
Westmoreland	2.90@3.15	.....	.....	1.15@1.60
West Virginia Fairmont ¾		2.60@2.70	2.60@2.70	0.80@0.90
Fairmont mine-run		2.50@2.60	2.50@2.60	.70@ .80
Steam		2.60@2.70	2.60@2.70	.80@ .90
Western Maryland		2.25@2.40	2.25@2.40	.80@ .90

Anthracite—The effects of the mild winter and the light demand for anthracite coal this spring have already become apparent and the companies are now curtailing production. What may be the first steps in this direction were taken last week by the Lehigh Valley Coal Co. when operations were suspended at its collieries for two days and a drastic curtailment program was started this week. It is expected that other companies will take similar action shortly.

Demand has fallen off considerably the past week and the shippers find themselves well supplied with all sizes. To save the situation it is necessary to cut down production and this it is believed will be done.

Nut coal is longest of the prepared sizes with stove and egg close seconds. Pea is much in evidence with few takers except on standing orders. The small steam sizes appear in greater abundance. The suspension of mining, however, will put these coals in a strong position. Some grades of pea coal have been disposed of as low as $3 during the week, while a few buyers have been able to pick up bargains in demurrage steam coals at lower figures than have prevailed in the hard coal market for some time.

Current quotations on anthracite are as follows:

	Lower Ports		Upper Ports	
	Circular	Individual	Circular	Individual
Broken	$4.65		$4.70	
Egg	4.90	$4.80	4.95	$4.85
Stove	4.90	4.80	4.95	4.85
Chestnut	5.15	5.00	5.20	5.05
Pea	3.35@3.50	3.10@3.35	3.40@3.55	3.15@3.40
Buckwheat	2.50@2.75	2.25@2.50	2.55@2.80	2.30@2.55
Rice	2.00@2.25	1.90@2.10	2.05@2.30	2.00@2.25
Barley	1.75@2.00	1.60@1.75	1.80@2.05	1.85@2.10

BALTIMORE

Bituminous slightly stronger and prices stiffer. Export tonnage continues large.

A slow but sure betterment is noted here in the bituminous trade. The prices for Pennsylvania coals are moving upward; ordinary grades that some weeks ago could be bought at around 85 to 90c. are not offering at present below $1, and are growing scarcer at that figure. So-called best Pennsylvania coals sell around $1.25 to $1.30, while certain specialized fuels command as high as $1.40 to $1.45.

West Virginia and Maryland coals hold their own, but show no special advance for the most part. Lower grade Maryland coals are offered around 80c. at the mines and Fairmont mine-run sells at 80 to 85c. Three-quarter gas at 90 to 95c. is steady.

Export movement continues strong. Last week approximately 48,000 tons was loaded for foreign ports from Curtis Bay and Port Covington piers. The May tonnage is expected to run considerably above 200,000 tons. The foreign vessels carrying coal also absorbed 16,000 tons for bunker supply the past week.

The charters for the past week included the following:

Vessel	Nationality	To	Rate	Vessel	Nationality	To	Rate
Luigi Ciampi	Italian	Italy		St. Winifred	British	Plate	
Harmattia	British	Italy		Cronchie	British	Italy	$10.80
Chiverstone	British	Montevideo	$9.60	Francisco	Italian	Italy	9.60
				Megree	Dutch	Plate	9.36
Semantha	British	Italy	9.60	Strathbeg	British	Sicily	9.60
Kerriemoor	British	Plate	9.60	Antigone	British	Plate	9.12
Holtye	British	Italy	9.60				
Anto. Accame	Italian	Italy					

OCEAN FREIGHTS

Coal charters twice as heavy as in normal times. Spanish shipments show a particularly rapid increase.

This country's export coal trade is growing daily, and instead of our chartering one or two steamers per day, as in the past, we are now chartering two or three steamers daily for this trade.

Mediterranean—Rates to West Coast of Italy are unchanged. and remain firm owing to the increased demand for steamers to take coal from this country to Spanish ports. Rates to Spanish ports are about $9.96 to $10.20, with 500 to 700 tons a day for discharging, consignees paying Spanish dues on cargo. (We believe that the Spanish dues were recently abolished by the Spanish Government.) These Spanish shipments are increasing materially owing to the recent English embargo. To Marseilles rates are about $10.20 for single trips, or $9.60 for a number of trips.

South America—To the Plate and Brazil we continue to charter almost daily at about 36c. per ton less than boats are being closed in London for similar voyages.

Cuba and West Indies—These rates are a trifle firmer.

The market is now quotable as follows:

To	Rate	To	Rate
Havana	$2.25@2.50	Bermuda	$3.50@3.75
Cardenas or Sagua	3.25@3.50	Vera Cruz	3.50
Cienfuegos	3.25@3.50	Tampico	3.50
Port au Spain, Trinidad	3.75@4.00	Rio	9.00@9.12
St. Lucia	3.50@3.75	Santos	9.12
St. Thomas	3.25	Montevideo	8.40
Barbados	3.75@4.00	Buenos Aires or La Plata	8.40@8.64
Kingston	3.00@3.25	Rosario	8.64@8.88
Curacao	3.75@4.00	Mediterranean*	10.80
Santiago	3.25@3.50	Spain**	10.08
Guantanamo	3.25@3.50	Valparaiso†	6.72
Demerara	5.50@6.00	Marseilles	10.20

Note—Rates noted in **bold face** type are only approximate.
* To a direct port on the West coast of Italy.
† With 800 tons per day discharge.
**Spanish dues for account.
W. W. Battie & Co.'s Coal Trade Freight Report.

HAMPTON ROADS

Export movement fair. Government colliers loading during week greatly decrease accumulated cars.

While the export movement has not been as heavy as anticipated it has been fairly good. Shipments for Italian ports have dropped off considerably, only one cargo having cleared between May 8 and 15. The largest amount of coal moving to any one port has gone to Montevideo, the tonnage being approximately 15,000. Shipments to Brazilian ports have amounted to about 18,000 tons. Coastwise shipments have as usual been heaviest to Boston, Providence, and Portland while other New England ports have taken some small cargoes.

In addition to coal shipments there have been some small quantities of coke moving to Havana in connection with parcel shipments of coal to that port. Various grades of high volatile and nut and slack have been moving coastwise and there is perhaps at this time less accumulation of nut and slack at Tidewater than has been the case for some months.

Vessels loading coal from Hampton Roads port for export during week of May 7 to 14, inclusive:

Norfolk			Norfolk		
Vessel	Destination	Tons	Vessel	Destination	Tons
Guildhall[2]	Havana	3424	Phineas W. Sprague	St. Michales	963
Christoforo Vagliano	Montevideo	3737	Henry Lippitt	Maranhao	1205
Bowden[3]	Port Morant	1200	Warren Adams	Maranhao	835
Sophie H[4]	Montevideo	4180	**Tordenskjold**	Canal Zone	5500
American Transport	Montevideo	6400	Newport News		
Annie[1]	Pernambuco	888	**Merity**	Rio de Janeiro	5000
Sedgwick[1]	Maranhan	758	**Apsley Hall**	Tarante	6200
Windermere	Vera Cruz	3800	**Sark**	Port Castries	5100
Silverton	Rosario	3430	**Denis**	Para	2751
Albert Hall	Rio de Janeiro	6532	**Europe**	Havana	3000

Note—Steamers are indicated by **bold face type**, all others being schooners. Shippers—[1] Smokeless Fuel Co. [2] New River Coal Co. [3] Crozer-Pocahontas Coal Co. [4] Castner, Curran & Bullitt.

Railroad Tonnages—Dumpings over the local piers for the past several weeks were as follows:

Railroad	Week Ending May 1	May 8	May 15
Norfolk & Western		208,179	151,113
Chesapeake & Ohio	60,967[1]	88,609[2]	80,045
Virginian	65,099	45,116	57,903
		341,904	289,061

[1]Week ending Friday. [2]Nine days.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Flixton	British	Philadelphia	Buenos Aires	2705	$9.12
Harmattan	British	Baltimore	Italy	3046	
Luigi Ciampa	Italian	Baltimore	Italy	2603	
Silverton	British	Norfolk	Rosario	1723	9.12
					2.16
Antigone	British	Baltimore	River Plate	1495	9.12
Alioth	Dutch	Baltimore	River Plate	1298	9.36
Megrez	Dutch	Baltimore	River Plate	1662	
Francesco	Italian	Baltimore	Italy	2160	
Antoinette Accame	Italian	Baltimore	Italy	1982	
Strathbeg	British	Baltimore	Sicily	2808	
Malm	Norwegian	Baltimore	Guantanamo	893	
Adelaide Barbour		Philadelphia	Porto Rico	1171	
St. Winifred	British	Baltimore	River Plate	2884	
William H. Clifford		Hampton R'ds	Azores	1378	
Monkshaven	British	Baltimore or Virginia	River Plate	2097	8.88 2.16
Nellie W. Craig		Philadelphia	Kingston	488	3.00
Columbia		Philadelphia	San Francisco	1188	
Semantha	British	Baltimore	Italy	1811	
Holtye	British	Baltimore	Italy	2714	
Matelot	Italian	Baltimore	Italy	2057	
Chiverstone	British	Baltimore	River Plate	1889	
Albert Hall	British	Virginia	Rio Janeiro	2737	
Olaf	Norwegian	Philadelphia	Havana	1021	
George E. Warren		Philadelphia	Bangor	1616	
Bradford C. French		Newport News	Brazil	920	
General E. S. Greeley		Baltimore	Mayport	1198	

Note—Steamers are indicated by **bold face tupe**, all others being schooners.

COKE

CONNELLSVILLE

Only modest inquiry for furnace coke. Active contracting for foundry coke for six and twelve month periods. Prices and output unchanged.

There are two or three inquiries for furnace coke for shipment over the second-half, but the inquirers are certainly showing no anxiety to close. Prompt furnace coke continues in poor demand. Contracting for foundry coke has increased further and is now at a rather lively rate. One of the large interests making a specialty of high-grade foundry coke is entering contracts freely at $2.40 for the twelvemonth beginning July 1, while another is trying where possible to restrict contracts at this figure to six months and two others are reported as firmly maintaining the position of selling for only six months. There is lower grade foundry coke to be had for any period desired at lower figures. We quote: Prompt furnace, $1.50@1.55; contract, to July 1, $1.60; contract to Jan. 1, $1.75; prompt foundry, $2@2.40; contract, $2.20@2.40, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended May 8 at 299,166 tons, an increase of 6275 tons, and shipments at 290,015 tons, a decrease of 13,362 tons.

Buffalo—The trade is quiet, the late reports of growing activity not being indications of any real stir. There is a little more coke moving, but the increase will have to be considerably more before there will be a better price. Iron works are doing a trifle better, but they do not show much sign of returning to a normal activity right away. Prices remain on the basis of $4.15 for best 72-hr. Connellsville foundry and $3.15 for stock coke.

Chicago—No change can be reported in the coke situation from last week. The demand is nil, although prices are well maintained, probably due to less production of byproduct sizes in the West. Prices are as follows: Byproduct, $4.45@4.65; Connellsville, $4.60@4.75; Wise County, $4.50@4.65; gas coke, $3.75@4; furnace, $4.50@4.65.

LAKE MARKETS

PITTSBURGH

Lake shipments slightly increased, but still small and market otherwise unimproved. Mines operating at 50 to 60% of capacity. Possibilities of car shortage.

Pittsburgh district coal shipments in the Lake trade are increasing steadily, but the total is still relatively small for the second half of May. The shipments going forward are chiefly to steady consumers, like the railroads, the ordinary buyers being still out of the market except in rare instances. Very little coal has been moved except by the regular shippers, purchases for shipment being very light. The usual asking price on Lake coal, ¾-in., is $1.15 but it is understood that on lots of any size this price would be shaded a few cents.

Occasional export shipments are being made from the Pittsburgh district, but only in cases where a particularly high-grade coal is required, as other districts can name much lower prices at Tidewater.

An interesting point in the situation is the fact that although coal shipments are far from heavy, mine operations being at only 50 to 60% of capacity, hopper cars are relatively scarce on the Baltimore & Ohio and one or two other lines. There is no actual shortage, but it is thought that with a slight further increase in demand some actual car shortages would develop.

Prices are about the same as formerly quoted. On contracts to Apr. 1, $1.15 would probably be shaded on mine-run. For free coal it is only occasionally that $1 is shaded for mine-run, the large mines adhering to this as minimum. Slack naturally softens as Lake shipments increase, producing more slack, otherwise prices for free coal are the same as last reported: Slack, 60@70c.; nut and slack, 90@95c.; nut, 95c.@$1; mine-run, $1@1.05; ¾-in., $1.10@1.15; 1¼-in., $1.20@1.25, per net ton at mine, Pittsburgh district.

BUFFALO

Bituminous market fails to show any improvement. Operations heavily curtailed. Anthracite also under heavy pressure. Coal started moving from Upper Lake docks.

There are conflicting reports on the Canadian trade. Buffalo salesmen agree that the demand there is much lighter than at home, but Canadians contend that the factories there are running at a good rate. It is going to take a decided increase in tonnage before it is much felt in the trade generally. Most mines are now working only two to three days a week.

Quotations remain on the basis of $2.70 for best Pittsburgh lump, $2.55 for three-quarter, $2.45 for mine-run and $2.25 for slack. Allegheny Valley coal is usually 25c. lower than Pittsburgh for sizes, all slack selling about on a par.

There has been an unusually large number of Pittsburgh coal men in the city during the past week.

Anthracite—It is seldom that the trade has been so dull. Some shippers report that there is some sign of improvement, but from what the others say the chances are that any small

change for the better looks large. Dullness is to be expected at this time of the year and nobody is alarmed, but the movement is too small for real comfort. It is not likely to improve right away.

Both the local and the rail-line trade is dull and the independent agent or jobber is about as slack as the regular companies. Cutting the price does not sell coal in any amount, either anthracite or bituminous. The amount of Lake coal loaded for the week foots up 156,000 tons, nearly all of it going to shippers' docks at the large ports.

COLUMBUS

Trade quiet and prices maintained with difficulty. Lake business still slow. Production shows a slight increase.

Trade is light in most departments and efforts are being made to maintain quotations. On the whole the price list is fairly well maintained despite cutting on the part of smaller operators and jobbers. The tone of the market is fairly good and many of the producers as well as wholesalers believe that conditions will improve materially when the stocking season arrives.

Domestic trade is quiet, which is to be expected at this season of the year. Some little buying of the fancy grades is reported although this is not large. Preference is being shown for Pocahontas and West Virginia varieties. Little demand is noted for Hocking at this time. Dealers' stocks are apparently sufficient for the present.

Lake Trade is increasing in volume but not fast. There is still considerable coal on the docks of the Upper Lake ports and consequently some shippers are slow in chartering bottoms. The interior movement from the docks is not rapid. With the opening of the eastern Ohio district a larger Lake trade is anticipated. Chartering of boats is more active since the scale has been signed.

Production in Ohio fields has not increased materially during the past week. In fact some of the districts do not show quite as large output. In the Hocking Valley the production is estimated at about 25% of normal and the same figures are good for Crooksville and Jackson. In the Cambridge field the output has been about 35%, Masillon has produced about 40%, while Pomeroy Bend reported 50%.

Prices in the Ohio fields are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	.....
Inch and a quarter	1.30	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	.60	.60	.55
Coarse slack	.50	.50	.45

CLEVELAND

Eastern Ohio mines are resuming operations and sales agents are working the Lake trade. The local market remains unchanged except for Youghiogheny slack, which is slightly stronger.

Current receipts of coal have been slightly under a week ago with only 200 cars coming in over Sunday. This is 100 cars short of the average over a period of several weeks. Some high-grade West Virginia mine-run steam coal was sold here at $1.65 Monday and was the bargain of the day. Every day last week there was an offering of some particular coal below the normal market price. Pan Handle slack figured in this business one day.

The sales of Youghiogheny slack Monday at $1.65 to $1.75 were easier than usual. The price was not particularly higher than other fine coals, but the demand seemed to be greater and the average price was better. Coarse coals are unchanged.

No. 8 operators put about 2000 men at work Monday and it is understood the entire field will have close to 10,000 men employed next week. This coal is being sold to Lake shippers mostly. No floating arrangements for the coal have been reported, but the supply of tonnage far exceeds the available coal.

Lake shippers report they are able to buy coal cheaper than in the last two years. Prices are from 5 to 15c. below quotations of last year, which in turn were lower than two years ago. So far Lake shipping has been very light. Full shipping is not expected before Aug. 1. Some shippers are only beginning to route coal to the Lakes and others are just beginning to increase bituminous shipments. Hard coal shipping has been normal so far this season.

Quotations for shipment to jobbers are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump	$3.10	.....	.....	.....	.....
Lump, ¾ in.	.....	$2.20@2.25	$2.00	$1.80@1.85	$1.75@1.85
Egg	3.10	.....	.....	.....	.....
Mine run	2.65@2.70	2.10	1.85	1.85@1.90	1.75@1.85
Slack	.....	1.65	1.60	1.65@1.70	.....

CINCINNATI

Gains in the Lake movement have not affected the local market. Buyers still confining their purchases to the open market.

The domestic demand is virtually negligible and the same is true of the steam market. The tendency has naturally been toward lower prices, and in many instances spot coal of all grades has sold at almost unheard-of figures. One of the worst effects of this has been to encourage consumers and retailers to hold off on their contracts, in the hope of getting their requirements at bargain prices. At present there is no relief in sight, save in the long-deferred hope of a general and emphatic improvement in the industrial situation, calling for better consumption.

LOUISVILLE

Unsettlement in industrial conditions has caused a slowing down. Some tendency to cut prices.

With industrial conditions so unsettled, the Kentucky coal trade is at a low ebb, purchases are on the hand-to-mouth order and for the time being the retailers are slowing up on their stocking operations. Prices are unchanged, on the basis of $1.30 for 4-in. block, though there is some tendency to cut prices. Salesmen are not having much success on the road and mine operations are heavily curtailed.

MIDDLE WESTERN

GENERAL REVIEW

Profound quiet prevails in all directions. Screenings still strong with no demand for other Illinois and Indiana sizes. Plans maturing for coöperation among Indiana companies.

There is no appreciable gain noted in sales and prices, with the exception of screenings, are inclined to be weak. Some shippers are of the opinion that the market is worse than last week, and that the immediate prospects are anything but encouraging. All agree that the demand is nil, yet there is a feeling that the present stagnation presages a brisk business once mid-summer is passed. Contracting continues slow and a large amount of tonnage is still unplaced. Retailers are taking no coal; the absorption of steam sizes, other than screenings, is backward considering the small output, and weather conditions are such as to cause even less than a minimum movement.

The industrial situation is showing some signs of improvement, which augurs well for the future, and the absence of stocks in the hands of retailers and consumers sustains the opinion that sooner or later a pronounced change will occur. In Chicago the strike of the building trades has reduced shipments to that point. Operations of brick, cement, concrete and crushed stone plants are practically at a standstill, and since the producers of building material are considerable users of Indiana and Illinois coal, the depressed state of the industry has had a detrimental effect.

The over-stocking of Lake coal last summer and fall is now bearing fruit, and these must be reduced before that situation will right itself. It is quite evident that the Lake business will not be active until the middle of July.

CHICAGO

Strong demand for screenings in all districts. Domestic grades generally flat except West Virginia grades. Anthracite slow.

The situation in Franklin and Williamson Counties has been enlivened by the increasing demand for screenings at higher prices. A goodly number of shipments have recently gone forward at $1 per ton. The demand for other sizes is below normal but prices are held steady.

Increasing quietness is observable in Indiana except on screenings, the supply of which hardly equals the demand. Prices of domestic sizes are not being well maintained, and concessions are being made to move what little domestic coal is screened.

The mines of the Springfield district have always shipped large quantities of coal on contracts each season, but so far this year few contracts have been closed, and only a little railroad tonnage is moving. Screenings are steadily absorbed at higher prices than last week.

The range of prices on eastern Kentucky coals is very wide, and there is little stability to the market.

The Pocahontas and smokeless situation has improved, and prices for Third Vein Pocahontas lump are strong at $1.60. Contracting progresses freely in these coals. It is now difficult to obtain shipments to this territory unless a previous allotment has been arranged. The stronger tone is probably influenced by the export situation. Splint coals have also sympathetically advanced, and are averaging perhaps 5c. to 10c. per ton better than last week.

Anthracite orders are not as plentiful as could be wished, but if the dealers fail to order this month they will be compelled to do so in the following month, or later, so that the average amount of business during the season is bound to be maintained whatever the current situation may be.

The Chicago market is now quotable as follows:

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Carterville
Lump	$1.25@1.35	$1.25@1.35	....	$1.25@1.40	$1.35@1.50
4-in. lump	....	....	$1.40	....	....
Steam lump	1.10	1.10@1.25	1.25@1.35	1.15@1.25	....
2½-in. lump	....	....	1.20@1.35	....	....
1½-in. lump	....	....	1.05@1.25	1.05@1.20	....
Mine-run	1.10@1.25	1.00@1.10	1.00@1.10	1.00@1.10	....
Egg	1.20@1.35	1.25@1.35	1.15@1.25	1.10@1.25	....
No. 1 washed	1.20@1.35	....	1.65	....	1.40@1.50
No. 2 washed	1.25@1.35	....	1.75	....	1.40@1.50
6x3-in. egg	1.20@1.35	....	....	....	1.50@1.60
Nut	1.10@1.30	1.10@1.25	.95@1.05	.90@1.10	....
No. 1 nut	1.25@1.35	....	....	....	....
No. 2 nut	1.20@1.35	....	....	....	....
Screenings	.90@1.00	.85@ .95	.80@ .95	.85@ .95	1.00

	Harrisburg Saline Co.	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump	$1.25@1.35	$1.15@1.35	$1.60	$1.60	1.25@1.50
1½-in. lump	1.15@1.25	1.10@1.25	....	....	1.15@1.35
Mine-run	1.00@1.10	....	1.15@1.25	1.25	....
Egg	....	.95@1.10	1.60	1.60	1.25
No. 1 nut	1.20@1.35	....	....	....	1.15@1.25
No. 2 nut	1.15@1.25	....	....	....	....
Screenings	.80@1.00	....	....	....	....

Greene County, 5-in. lump, $1.15@1.25; 3-in. lump, $1.10@1.15; 5-in. egg, $1.10@1.15; 3-in. egg, $1.05@1.15; mine-run, $1@1.05; screenings, 90c.@$1.

ST. LOUIS

Screenings continue the market leader. Pool of the Standard operators not maintained.

Continued quietness prevails with the exception of the screenings market, which is unusually strong. Carterville screenings sell at from 95c. to $1, and in the Standard field they are worth from 90 to 92½c. Such little washed coal as is being produced is bringing its own figures. Carterville lump has sold down as low as $1, while the general circular is from $1.10 to $1.30. The other screened sizes are holding to the same figures.

The effort on the part of the Standard operators to maintain reasonable prices is not coming up to expectations, due to the fact that some of the operators are employing questionable methods of marketing their coal. Some of those in the arrangement to sell their coal through a general selling agency, have sold lump as low as 90c., when their circular calls for $1.10, and 6-in. lump which has been quoted at $1.20 was sold as low as $1.05.

PRODUCTION AND TRANSPORTATION STATISTICS

Exports of domestic coal and coke, from the United States, and bunker coal laden on vessels engaged in the foreign trade at the specified districts, during the month of March, were as follows:

EXPORTS BY DISTRICTS

Districts	Anthracite Tons	Bituminous Tons	Coke Tons
Maine and New Hampshire	83	.....	.....
Maryland	.....	76,888	.....
New York	4,603	554	31
Philadelphia	2,371	43,290	330
Porto Rico	.....	290	.....
Virginia	.....	262,687	452
Florida	329	.....	.....
Mobile	24	799	.....
New Orleans	.....	154	7
Arizona	.....	1,837	7
El Paso	.....	32,050	13,177
Laredo	.....	891	.....
San Francisco	.....	50	10
Southern California	40	29	.....
Washington	.....	840	1,372
Buffalo	83,696	172,359	36,881
Dakota	251	2,541	133
Duluth and Superior	30	3,242	40
Michigan	.....	40,643	5,725
Ohio	.....	16,817	26
Rochester	797	19,100	302
St. Lawrence	34,583	17,685	1,148
Vermont	388	108	60
Total	127,195	692,854	59,701

Bunker Coal

Customs Districts	Gross Tons
New York	267,104
Philadelphia	32,948
Maryland (Baltimore)	35,265
Virginia	120,357

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for January and the preceding three months:

	December		January		February	
State	1913	1914	1914	1915	1914	1915
Missouri	266,335	285,547	277,609	276,641	259,270	225,996
Kansas	540,872	643,213	526,300	637,708	492,304	492,320
Arkansas	138,678	123,737	162,056	125,275	113,354	102,451
Oklahoma	324,728	352,267	333,125	371,309	257,162	302,026
Totals	1,270,613	1,404,764	1,299,090	1,410,933	1,122,090	1,122,793

NORFOLK & WESTERN RY.

The following is a statement of coal handled by the N. & W. Ry. during April and the past four months in short tons:

	January	February	March	April
Pocahontas Field	912,682	835,826	1,003,437	1,163,948
Tug River District	298,766	243,910	282,886	285,243
Thacker District	257,580	195,557	227,817	245,887
Kenova District	98,422	67,667	66,605	112,076
Clinch Valley District	169,581	129,193	144,031	138,970
Other N. & W. Territory	3,769	1,785	2,478	3,271
Total N. & W. Fields	1,740,800	1,473,938	1,727,254	1,949,395
Williamson & Pond Creek R.R.	58,296	58,101	48,052	55,311
All other railroads	87,842	88,982	129,446	195,845
Grand total	1,886,938	1,621,021	1,904,752	2,200,551

Distribution of shipments for March and April were:

	March			April		
	Shipped	Tipple	Total	Shipped	Tipple	Total
Pocahontas	879,237	13,433	892,670	1,057,142	12,542	1,069,684
Tug River	281,162	1,261	282,423	282,815	2,428	285,243
Thacker	182,943	7,986	190,929	210,144	6,811	216,955
Kenova	58,867	7,738	66,605	103,941	8,135	112,076
Total	1,402,209	30,418	1,432,627	1,654,042	29,916	1,683,958

Shipments of coke entirely from the Pocahontas field, amounted to 61,075 tons.

FOREIGN MARKETS

GREAT BRITAIN

Prohibition of exports the feature of the market. Situation uncertain. Labor troubles also serious.

May 7—The coal trade of the country is somewhat unsettled and rather quiet. The decision of the Premier that the question of the miners' bonus must be considered by the District Conciliation Boards has given a little more confidence in the trade, and the results are awaited with more than the usual interest which is associated with wage questions. Another matter of grave importance is the announcement of the Government Order prohibiting coal exports except under license. This has caused considerable stir. It is understood that all ships sailing from our ports, except liners, will have to obtain from the Committee licenses specifying the quantity of coal to be exported. Restricted exports would also seriously affect shipping by depleting the outward business and throwing greater freight cost on the imported food stuffs and other commodities which form the return cargoes of coal boats.—"The Iron and Coal Trades Review."

May 4—The export of coal and coke, except under license is prohibited to all destinations other than British possessions and protectorates and allied countries, also Portugal. The uncertainty which prevails in connection with this prohibition is holding up business at present. Quotations are more or less normal as follows:

Best Welsh steam	Nominal	Best Monmouthshires	$8.04@8.16
Best seconds	Nominal	Seconds	7.92@8.04
Seconds	$8.52@8.76	Best Cardiff smalls	5.16@5.28
Best dry coals	8.40@8.88	Cargo smalls	4.44@4.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Chartering is also greatly affected by the prohibition of exports and rates are approximately as follows:

Gibraltar	$4.80	Naples	$6.24	Las Palmas	$5.04
Marseilles	5.79	Venice	9.60	St. Vincent	5.16
Algiers	5.79	Alexandria	6.60	Rio de Janeiro	6.60
Genoa	6.24	Port Said	6.60	Monte Video	6.00
				River Plate	6.24

Note—These quotations are based on an exchange rate of 24c. to one shilling.

SPAIN

The Spanish imports of coal for January of the current year amounted to 118,749 tons as compared with 231,661 tons for the same month last year. Coke imports for the same periods were 9464 tons in 1915 and 29,146 tons in 1914.

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

✚Indicates contracts regarding which official information has been received.

Recast

In the following table we give a list of all old contracts coming up for consideration during the ensuing week. The table gives our contract number, the name of the purchaser, city, tonnage and page on which the detail notice appeared.

No.	Purchaser	City	State	Tonnage	Page
454	Mun. Elec. Light Dept.	Cleveland,	Ohio		875
535	Whiteside Baking Co.	Louisville	Ky.		708
649	Lighthouse Inspector	New Orleans	La.		835
677	Board of Education	Everett	Mass.	2000a	876
677	Board of Education	Everett	Mass	2500b	876
690	Board of Education	Port Huron	Mich.	1200	877

a Indicates anthracite coal b Indicates bituminous.

Supplemental Notes

✚**No. 312—Chicago, Ill.**—Bids on this contract (pp. 488, 666, 748), which provides for furnishing the city with about 2000 tons of coal per month, were as follows:

Bidde.	Name of Fuel	Moisture	Ash	B.t.u. per Lb. of Dry Coal	Price Delivered	*Net B.t.u. for One Cent
Martin Howe Coal Co.	Lincoln—Lincoln Co., Ill.	10	12	12,500	$1.58	137,195
Ender Coal & Coke Co.	Centralia—Marion Co., Ill.	8	15	12,300	1.62	133,522
Northern Coal Co.	Sunshine—Perry Co., Ill.	9	13	12,500	1.687	129,851
Northern Coal Co.	Springfield—Sangamon Co., Ill.	11	15	12,000	1.57	129,848
Northern Coal Co.	Centralia—Marion Co., Ill.	10	14	12,400	1.649	129,843[1]
Golsen Doan Coal Co.	Centralia—Marion Co., Ill. / Warrick—Warrick Co., Ind	9	15	12,300	1.67	128,286
Edwin F. Daniels & Co.	Glenridge—Marion Co., Ill.	10	13	12,300	1.67	127,608
Peabody Coal Co.	"Shellback"—Williamson Co., Ill.	8.5	14	12,400	1.80	121,348
Consumer's Co.	2" Screenings—Perry Co., Ill.	12	13.77	12,323	1.72	121,242

*The lowest bid is the one furnishing the greatest number of net B.t.u. for one cent. This is computed from figures furnished by bidders, as per rule in specifications.

$$\text{Net B.t.u. for one cent} = \frac{2000 \times \text{B.t.u. per lb. dry coal} \times (100\% \text{ less } \% \text{ of moisture as delivered})}{\text{Price per ton delivered} + (\tfrac{1}{2}\text{c.} \times \text{number of } \% \text{ of ash in dry coal})}$$

[1] Bid informal—B.t.u. as guaranteed below minimum allowed in specifications.

✚**No. 486—Boston, Mass.**—Bids on this contract (p. 665) will be received until 10 a.m., May 25. The contract involves 47,000 tons of semibituminous steaming coal and 6800 tons of birdseye for use at the 15 institutions of the State Board of Insanity. Specifications and proposal forms may be obtained on application. Address E. R. Libby, Room 6, State House, Boston, Mass.

✚**No. 588—Everett, Mass.**—The approximate requirements on this contract (p. 749), which provides for furnishing the local schools with coal during the ensuing year, are 2000 tons of anthracite, 1500 tons of bituminous mine-run and 1000 tons of screenings. All the coal is to be delivered in the bins at the various schools, as the committee may designate. Bids will be received until 8 p.m., May 28, and must be on the printed forms, which may be obtained on application. Address Chn. of Com. on Fuel Charles Manser, High School Bldg., Everett, Mass.

✚**No. 592—Nashville, Tenn.**—Bids on this contract (p. 750) will be received until noon, May 31. The contract will cover the fiscal year beginning June 1, 1915. Address Business Mgr. H. S. Van Doren, Bd. of Edu., Hume-Fogg High School Bldg., Nashville, Tenn.

✚**No. 504—Dover, N. J.**—Bidders on this contract (p. 665) were as follows, arranged in order of their excellence, according to the Government's interpretation of the analysis submitted:

	Bidder	Coal	B.t.u. per Lb.	Price Tons	Price Cents*
	Mine-run				
2	Moreland Coke Co.	Columbia	14,000	$3.30	10.61
4	C. P. Burtner C. Co.	Hamilton	14,764	3.60	10.66
5	Birch & Bassett	Cardiff	14,400	3.51	10.70
6	Greensburg C. & C. Co.	Clearfield	14,400	3.49	10.72
7	Penna. C. & C. Corp.	Gallitzen	14,500	3.50	10.73
8	D. W. Hughes & Co.	Woodland	14,190	3.45	10.77
9	Wharton C. & C. Co.	Wharton	14,060	3.35	10.78
10	Keystone C. & C. Co.	Cardiff	14,300	3.50	10.78
11	C. P. Burtner C. Co.	Burtner	14,065	3.35	10.79
12	Empire C. Mining Co.	Empire	14,400	3.48	10.83
13	Glen Brook Coal Co.	Conemaugh	14,600	3.60	10.86
14	Glen Brook Coal Co.	Carnwath	14,600	3.60	10.86
15	Vinton Colliery Co.	Vinton	14,650	3.55	10.87
18	Blaine Mining Co.	Quemahoning	14,400	3.55	10.92
19	Geo. D. Harris Co.	Ligonier	14,050	3.42	10.93
20	John Wills	Wills 2 and 3	14,360	3.46	10.94
21	D. W. Hughes & Co.	Hamilton	14,300	3.60	10.99
22	Willard H. Bradford	Victoria	14,500	3.585	11.01
23	Hartwell, L. & C.	Brush Creek	14,300	3.47	11.04
24	Weston, Dodson & Co.	Navajo	14,200	3.53	11.07
25	Pattison & Bowns	Vivian	14,500	3.65	11.11
26	Geo. D. Harris Co.	Margaret	14,500	3.60	11.11
27	D. E. Williams Co.	Glenwood	14,500	3.60	11.19
28	Punxsutawney C. M. Co.	Frances	14,000	3.54	11.20
29	Peale, Pea. & Kerr	Victor	14,200	3.498	11.20
30	Hite & Rafetto	Bird	14,040	3.50	11.25
31	Willard Bros.	Valona	14,250	3.55	11.27
32	Maryland C. & C. Co.	Imperial	14,500	3.69	11.28
33	Maryland C. & C. Co.	Bernice	14,000	3.54	11.32
34	Marshall, Mat. & Co.	Curnard	14,400	3.70	11.34
36	D. W. Hughes & Co.	South Fork	14,200	3.65	11.39
37	Chas. Dunlop	Richhill	14,300	3.60	11.39
38	National Coal Co.	Georges Creek	14,500	3.80	11.69
39	Thorne, Neal & Co.	South Fork	14,800	3.95	11.83
	Slack				
1	B. Nicoll & Co.	Thomas Slack	13,800	$3.20	10.37
3	Hartwell L. & C.	R. & P. C. I. Co.	14,000	3.32	10.65
16	Peale, Pea. & Kerr	Victor	14,000	3.398	10.91
17	Greensburg C. & C. Co.	Slack	13,500	3.39	10.92
35	National Coal Co.	Georges Creek	13,300	3.30	11.36

*Cents per 1,000,000 B.t.u.

Address Lt. Col. Ord. Dept. Adus C. Norney, Picatinny Arsenal, Dover, N. J.

✚**No. 615—Seattle, Wash.**—Bids on this contract (p. 795) were received until 11 a.m., May 19. The tonnage involved amounts to about 400 tons of Australian steam coal to be delivered in bulk for the U. S. Coast and Geodetic Survey Steamer "Patterson." Delivery is to be made at ship's side on pier at Unalaska, Alaska, in lots of 100 tons per month, beginning in July. Address H. C. Denson, U. S. Coast and Geodetic Survey, 204 Burke Bldg., Seattle, Wash.

✚**No. 620—Webster, S. D.**—Both the Berwind Fuel Co. and the Northern Coal & Dock Co. bid on this contract (p. 795) $2.75 for Pocahontas screenings and $3.25 for run of pile coal. Address City Auditor J. P. Egeland, Webster, S. D.

✚**No. 647—Worcester, Mass.**—The bids received on this contract (p. 835) were as follows:

	Court House	House of Correction	Training School—Anthracite	Training School—Bituminous
Clafflin, Sumner Co.	$7.19	$4.50†	6.73	$4.65**
F. E. Pavers	6.92½	3.95	....	4.95
Peoples Coal Co.	6.97	3.94	6.75	4.60
Carlson-Hammond Co.	7.30	....	....	....
Seiler-Blanchard Co.	6.25*	....	6.65*	....

*F.o.b. †Also $4.25 and $3.90. ** Also $4.55 and $4.40.

Address County Commissioners' Court House, Worcester, Mass.

✚**No. 650—Pittsburgh, Penn.**—The bids on this contract (p. 835), which provides for furnishing the local Board of Education with about 14,000 tons of coal, will be closed on May 27, but awards will not be made until June 22. Address Supt. of Supplies C. M. McKee, Fulton Bldg., Pittsburgh, Penn.

✚**No. 656—Murphysboro, Ill.**—We are advised that there has been no inquiry about coal on this contract (p. 836) up to May 11. Address Supt. W. O. Settle, Murphysboro Water Works, Electric & Gas Light Co., Murphysboro, Ill.

No. 706—New York—Bids on this contract (p. 877), which calls for furnishing and delivery of 178,533 tons of anthracite coal, 63,060 tons of mine-run and 600 tons of gas coal for fourteen city departments, were divided into twenty zones as

follows: No. 1, Manhattan, south of 23d St.; No. 2, 23d St. to 59th St.; No. 3, 59th St. to 110th St.; No. 4, north of 110th St.; No. 5, Brooklyn, Northwest Section; No. 6, Brooklyn, Southwest Section; No. 7, Brooklyn, Greenpoint and Williamsburg Section; No. 8, Brooklyn, Canarsie, Brownsville, East New York and Eastern Parkway Sections; No. 9, Brooklyn, Bensonhurst, Coney Island, Gravesend and Sheepshead Bay Sections; No. 10, Queens, Long Island City Section; No. 11, Rockaway, Rockaway Park, Far Rockaway and Arverne, Queens; No. 12, Woodhaven, Richmond Hill and Jamaica, Queens; No. 13, College Point, Whitestone and Flushing, Queens; No. 14, Maspeth, Winfield, Elmhurst, Newtown and Corona, Queens; No. 15, The Bronx, south of Tremont Ave. and 177th St.; No. 16 The Bronx, north of Tremont Ave. and 177th St.; No. 17 Richmond; No. 18, water-front deliveries in barge loads; No. 19, Croton Water Shed Region and Otisville, N. Y.; No. 20, Long Island Water Shed Region outside city limits. Tonnages required in the different zones are as follows:

						—Buckwheat—		
Zones	Egg	Stove	Nut	Broken	Pea	No. 1	No. 3	Bitu.
1	3,038	354	144	324	2,800	200	1,300	265
2	1,228	402	59	190	1,300	475		
3	1,191	249	193	500		1,150	3,100	1,550
4	951	434	50	150		4,150		
5	2,064	1,606	84	100	650	4,250	8,215	180
6	696	222	30			3,275		
7	588	398	50		1,000	220		
8	1,310	390	94		20	31,475		19,000
9	284	159	22		1,000	800		
10	319	18	18					
11	246		10					
12	396	15	2			800		500
13	140	15	9			1,300		
14	720	96	31					
15	1,019	162	55			275		
16	1,319	154	19	102	2,045	2,300	5,000	2,500
17	225	165	45			17,800		
18	4,200	2,915			2,535	33,800	14,260	20,415
19	143	1,605	241		30			
20						400		18,650
	20,077	9,359	1,156	1,366	11,380	102,870	31,875	63,060

Zone No. 3 also requires 450 tons of buckwheat No. 3 and zone 18, 600 tons of gas coal. Totals in gross tons: anthracite, 178,533; mine-run, 63,060; gas, 600; grand total, 242,193. Address Contract Clerk, Room 1226, Municipal Building, New York.

New Business

No. 713—Cincinnati, Ohio—Sealed proposals will be received up to noon, May 25, by the Board of County Commissioners of Hamilton County, Ohio, for the purchase and delivery of smokeless coal at the Court House, Armory, Morgue and the Memorial Building. The contract is to run for a period of one year from June 15. All coal must be the best smokeless for steam and heating purposes and is to be delivered in such quantities and at such times as may be necessary. All bids must be accompanied by a bond in the sum of $300 or a certified check for $100. The County Commissioners reserve the right to reject any or all bids. Address Clk. Al Reinhardt, Board of County Commissioners, Cincinnati, Ohio.

No. 714—Toronto, Can.—The Queen's Hotel is now taking bids for a year's supply of heating coal and the contract will be closed within a week or two. Approximately 1700 tons will be required, and the average price paid is $4. Address Manager, Queen's Hotel, Toronto, Can.

✚No. 715—New York, N. Y.—The Immigration Commissioners at Ellis Island will receive bids until 10:20 a.m., May 24, for anthracite coal to cover their requirement during the ensuing year. Address Commissioners of Immigration, Ellis Island, New York Harbor, N. Y.

✚No. 716—Puget Sound, Washington, D. C.—Sealed bids will be received until 10 a.m., June 1, for furnishing 100 tons of foundry coke (Stock No. 5) to be delivered in covered lighters alongside wharves at the navy yard, as may be directed. The deliveries are to be made during the fiscal year ending June 30, 1916, and within 30 days after receipt of order. (Government Schedule No. 8261). Address Paymaster Gen. of the Navy Samuel McGowan, Bureau of Supplies and Accounts, Washington, D. C.

✚No. 717—Burlington, Iowa—The Board of Education at this place will contract about June 1 for 800 tons of mine-run coal and 1400 tons of lump. The call for bids is advertised and the purchase usually made through local dealers. The current contract is being filled with Fulton County, Ill., mine-run at $2.35 per ton, and Franklin County, Ill., 6-in. lump at $3.20 per ton. Address Fuel Committee, Board of Education, Burlington, Iowa.

No. 718—Toronto, Can.—The King Edward Hotel of this city is now in the market for 9000 tons of coal, the great bulk of which is bituminous. Tenders are not advertised for but the exact needs can be obtained by application. The usual figure obtained is considerably less than $4. Address Manager, King Edward Hotel, Toronto, Ont.

✚No. 719—Revere, Mass.—Sealed proposals were received until noon, May 21, for furnishing coal required at the city buildings during the ensuing year. Specifications are on file at the office of the City Engineer. Address Mayor Arthur B. Curtis, Revere, Mass.

✚No. 720—Baltimore, Md.—Sealed proposals will be received at the office of the Lighthouse Inspector for furnishing anthracite and bituminous coal during the fiscal year ending June 30, 1916. Blank proposals, etc., may be had on application. Address Lighthouse Inspector, Baltimore, Md.

No. 721—Limoges, France—An inquiry was made at this office by a correspondent for a French concern who is desirous of getting in touch with American exporters of anthracite coal with a view to obtaining a supply during the continuance of the European war. Address Leonard Rouguart, 37 Murray St., New York.

✚No. 722—Toronto, Canada—Sealed proposals will be received by the Toronto General Hospital until May 25 for about 8500 tons of bituminous screenings, 40 tons of anthracite stove, 25 tons of egg and 5 tons of nut. All coal to be of the best quality. Address Secy. and Treas. A. F. Miller, Toronto General Hospital, Toronto, Can.

No. 723—Boston, Mass.—Sealed proposals will be received at the office of the Lighthouse Inspector, Boston, Mass., until May 25, 1915, for furnishing anthracite and bituminous coal for use in the second lighthouse district for the fiscal year ending June 30, 1916. Blank proposals and particulars may be obtained on application. Address the Lighthouse Inspector, 19 Congress St., Boston, Mass.

No. 724—Toronto, Can.—Bids will be received by the Lumsden Bldg. for a supply of coal from Aug. 30 until May 15. It is likely that all tenders will close before the end of May. Address, Building Superintendent, Lumsden Bldg., Toronto, Can.

✚No. 725—Northampton, Mass.—Bids will be received by the county authorities until noon, June 1, for furnishing the coal required at the Court House, Jail and Hampshire County Sanatorium until Apr. 1, 1916. Philadelphia & Reading Coal & Iron Co.'s hard white ash coal is required, and deliveries are to be made in such quantities and at such times as required. Address County Commissioners, Court House, Northampton, Mass.

✚No. 726—New York—Sealed bids will be received by Fire Commissioner Robert Adamson until 10:30 a.m., June 1, for furnishing and delivering anthracite coal for use on the Fire Boats of the Department, for the period ending Apr. 1, 1916. Blank forms and further information may be obtained on application. Address Robert Adamson, Fire Com., Municipal Bldg., New York City.

✚No. 727—Muncie, Ind.—The Board of Education at this place will be in the market some time during next month for approximately 1200 tons of West Virginia splint coal. The call for bids is advertised, and the business done on a competitive basis. Address Board of Education, 445 The Johnson, Muncie, Ind.

✚No. 728—Bryan, Ohio—Bids will be received by the Board of County Commissioners of this place until 1 p.m., June 8, for furnishing 125 tons of anthracite furnace coal. Address County Auditor C. R. Lowe, Bryan, Ohio.

✚No. 729—Vicksburg, Miss.—Sealed proposals will be received until noon, June 1, for furnishing about 10,000 tons of bituminous coal to contractor's barges engaged in the Third Mississippi River District. Complete details and specifications may be had an application. Address Maj. Engrs. J. R. Slattery, U. S. Engr. Office, Third Mississippi River District, Vicksburg, Miss.

✚No. 730—Louisville, Ky.—The Board of Education at this place will receive bids until 3 p.m., May 26, for furnishing the annual supply of coal for the fiscal year beginning July 1. All bids must be accompanied by a certified check for varying amounts, dependent upon the amount of the bid. The requirements are as follows: Western District, 1923 tons of nut and slack, 195 tons of lump, 115 tons of mine-run. Central District, 3267 tons of nut and slack, 64 tons of lump, 837 tons of mine-run. Eastern District, 1087 tons of nut and slack, 127 tons of lump, 383 tons of mine-run. Bids must include all expenses incident to the delivery and storage of the coal. Full details and proposal forms may be obtained on application. Address Business Dir. Samuel D. Jones, Administration Bldg., Eighth and Chestnut St., Louisville, Ky.

No. 731—Toronto, Can.—The Prince George Hotel is said to be in the market for a year's supply of bituminous coal. The average yearly consumption is 2000 tons. Address, Manager, Prince George Hotel, Toronto, Can.

No. 732—Marshall, Minn.—The Electric Light & Water Works Plant at this place will be in the market some time during June for about 20,000 tons of Elkhorn (Kentucky) screenings. The business is usually done at about $4.55 per ton, and the call for bids is always advertised. Address Supt., A. L. Fields, City Electric Light & Water Works Plant, Marshall, Minn.

No. 733—Providence, R. I.—Sealed proposals will be received by the Board of Control and Supply until 10 a.m., June 10, for furnishing the coal supply. Specifications and information may be obtained on application. Address Secy. Gilbert R. Parker, Bd. of Control and Supply, Room 18, State House, Providence, R. I.

✚**No. 734—Brookings, S. D.**—The Light, Heat & Water Department at this place will be in the market some time during June for approximately 2000 tons of Wilmington (Illinois) coal. The contract is made on a competitive basis and is usually closed at about $4.20 per ton delivered. Address Supt. A. W. Morton, Light, Heat & Water Dept., Brookings, S. D.

✚**No. 735—Davenport, Iowa**—The Board of Education here usually contracts the second Monday in June for its annual requirements of coal involving about 2200 tons of lump and 700 tons of slack coal. The call for bids is advertised in the local papers and the business done on a competitive basis. Address Secy. J. D. McCollister, Bd. of Edu., 1144 Main St., Davenport, Iowa.

✚**No. 736—Covington, Ky.**—The Board of Education at this place will be in the market some time during June or July for about 500 tons of 2-in. lump coal. The call for bids is advertised, and the coal bought in carload lots. The usual price is about $1.30 per ton at the mine. Address Business Dir. W. A. Shore, Bd. of Edu., Covington, Ky.

✚**No. 737—Charleroi, Penn.**—The Board of Education here received bids till 7 p.m., May 18, for furnishing approximately 18,000 bu. of mine-run coal to be delivered to the various school buildings. Address Secy. T. M. Faddis, Bd. of School Directors, Charleroi, Penn.

✚**No. 738—Flint, Mich.**—Bids were received until 10 a.m., May 18, for furnishing the Michigan School for the Deaf at Flint, Mich., with approximately 2500 tons of bituminous coal during the year, beginning July 1. Specifications may be had on application. Address Steward H. R. Niles, Michigan School for the Deaf, Flint, Mich.

✚**No. 739—Joliet, Ill.**—The Board of School Inspectors at this place will contract some time during June or July for approximately 2500 tons of coal. Pana lump is being used at present which costs about $2.50 per ton delivered at the school buildings as required. The call for bids is advertised. Address Board of School Inspectors, Library Bldg., Joliet, Ill.

✚**No. 740—San Antonio, Tex.**—The Board of Education of this place will be in the market some time during June or July for their annual requirements of coal involving about 750 tons. The best commercial McAlester lump coal is used, the current contract being closed on the basis of $6.85 per ton. About 600 tons is delivered in the summer, and the balance as required. The call for bids is advertised. Address Business Agent of the Board, Prudential Bldg., San Antonio, Tex.

✚**No. 741—Catasauqua, Penn.**—Sealed proposals will be received by the local Board of Education until 7:30 p.m., May 28, for furnishing 300 long tons of stove coal to the local schools. Address Secy. C. H. Riegel, Borough of Catasauqua, Catasauqua, Penn.

✚**No. 742—Saginaw, Mich.**—The Board of Education at this place will be in the market during the latter part of next month for their annual requirements of coal involving about 1300 tons of steam lump and 2000 tons of slack. The lump coal is used at the Ward Schools and the Slack at the Training School, the cost of the former being about $2.90 and the latter $2.30. The present contract on the lump coal is being supplied from the Caledonia Mines in Saginaw County, Michigan, and the slack is being furnished from the Bliss Mine in Swan Creek County. The call for bids is advertised and the business let on a competitive basis. Address Business Agt. W. E. Klumpp, Bd. of Edu., Saginaw, East Side, Mich.

✚**No. 743—Demopolis, Ala.**—The Electric Light & Power Co. at this place will be in the market some time during next month, or in July, for their annual requirements of coal involving about 1500 tons of mine-run. The business is usually let at about $2.40, and the call for bids is advertised. Address Purchasing Agent, Demopolis Electric Light & Power Co., Demopolis, Ala.

✚**No. 744—Moultrie, Ga.**—The Electric Light Department at this place will be in the market some time during the summer for their annual requirements of coal involving about 200 tons of screened mine-run. It is understood that the business is not let to competitive bids and the current contract is being filled at $3.20 per ton. Address J. M. George, City Light Dept., Moultrie, Ga.

✚**No. 745—Houston, Texas**—The Board of Education here will be in the market about June 20 for their annual requirements of coal involving about 900 tons of Alabama 6-in. lump. The current contract is being filled at $4.65 per ton delivered at the buildings. The call for bids is advertised. Address Public School Board, Houston, Tex.

✚**No. 746—Seattle, Wash.**—The School Board at this place will be in the market some time during June or July for their annual requirements of coal involving about 8000 tons of mine-run. The present contract is being filled on Black Diamond coal at about $4.15 per ton delivered at the schools. The call for bids is advertised. Address the School Board, 347 Central Bldg., Seattle, Wash.

✚**No. 747—Pittsburgh, Penn.**—Sealed proposals will be received until 10 a.m., May 25, for furnishing the coal requirements at nine different pumping stations and the Pittsburgh City Home and Hospital and the North Side City Home during the fiscal year beginning June 1. Specifications and blank forms may be had on application. All bids must be accompanied by a suitable bond as provided by the city ordinances. Address Dir. F. P. Booth, Dept. of Supplies, 314 Oliver Bldg., Pittsburgh, Penn.

✚**No. 748—Detroit, Mich.**—Sealed proposals will be received by the Dept., of Parks and Boulevards until May 24 for furnishing coal as follows: 1000 tons of bituminous nut, pea and slack for delivery at the Power Plant on Belle Isle Park; 300 tons of bituminous lump or smokeless lump, anthracite, for delivery at the same place; 300 tons of smokeless lump for delivery to road rollers; 200 tons of anthracite stove or egg or smokeless lump for delivery at Palmer Park, Clark Park and City Barns. Address Secy. H. W. Bush, Dept. of Parks and Boulevards, 201 City Hall, Detroit, Mich.

✚**No. 749—Perrysburg, N. Y.**—Bids will be received until May 29, for supplying the J. N. Adam Hospital at this place with 2500 tons of three-quarter bituminous coal and 500 tons of anthracite. Delivery to be made during the fiscal year beginning with July. Address Supt. Clarence L. Hyde, J. N. Adam Hospital, Perrysburg, N. Y.

No. 750—Hartford City, Ind.—The contract of the City Government for their fuel supply expires about the first of next month, and the City Council proposes testing out various grades of coal before closing a new contract. The present contract is with the Norfolk & Chesapeake Coal Co. on the basis of $1.10 per ton, f.o.b. mines. Several coal companies are investigating the possibilities of obtaining the business, which involves about two car loads a month. Address City Council, Hartford City, Ind.

✚**No. 751—Washington, D. C.**—Sealed bids will be received until 10 a.m., June 1, by the United States Navy (Schedule 8288, Steam Engineering) for furnishing anthracite and bituminous coal during the fiscal year beginning June 30, as follows: Portsmouth Navy Yard 75 tons of pea; 150 tons of egg; 120 tons of stove. Boston Navy Yard 100 tons of anthracite stove; 325 tons of egg coal, 5 tons pea coal. West Hingham (Mass.) Naval Magazine, 150 tons anthracite. Iona Island, N. Y., 2000 tons pea; 60 tons egg; 75 tons nut. Fort La Fayette, N. Y., 50 tons egg coal. Naval Hospital, N. Y., 2000 tons of broken, best quality of white ash and 50 tons of stove same grade. Brooklyn, N. Y. 200 tons Cumberland coking coal. Philadelphia Navy Yard, 25 tons of anthracite nut; 150 tons anthracite broken; 100 tons anthracite stove. Philadelphia Naval Home. Quotations are requested on approximately 2000 tons of anthracite, pea, buckwheat, rice and barley, deliveries to be made in 100 ton lots. Washington Navy Yard, 3000 tons egg coal; 150 tons of red ash stove; 300 tons of white ash egg; 500 tons pea coal. Norfolk Navy Yard 300 tons of anthracite broken; 85 tons of anthracite; 85 tons of white ash furnace. Norfolk Naval Hospital 150 tons of anthracite, 150 tons of white ash stove. Address Paymaster Gen. U. S. Navy Samuel McGowan, Washington, D. C.

✚**No. 752—Washington, D. C.**—Sealed proposals will be received by the U. S. Navy (Schedule 8287, Ordnance, Construction and Repair, and Steam Engineering) until 10 a.m., June 1, for furnishing coke as follows: Portsmouth Navy Yard (Kittery, Me.) 100 tons, 72-hr. foundry, and 250 tons egg coke. Boston Navy Yard, 250 tons hard coke. Brooklyn Navy Yard, 4000 bu. gas coke. Philadelphia Navy Yard, 120 tons nut coke; 500 tons Connellsville 72-hr. foundry. Washington Navy Yard, 1000 tons coke. Norfolk Navy Yard, 800 tons 72-hr. foundry coke. South Carolina Navy Yard, 450 tons cupola coke. Deliveries are to be made during the fiscal year beginning June 30. Address Paymaster Gen. of the Navy Samuel McGowan, Washington, D. C.

✚**No. 753—Irvington, N. J.**—The Board of Education at this place received bids up to May 20 for supplying coal to the

local schools. As a result of a protest regarding the phraseology of the first call for bids, all proposals received were returned unopened, and new bids will be asked for. Address Chn. of the Supply Com. Bd. of Edu., George H. Smalley, Irvington, N. J.

✚**No. 754—Edgewater, N. J.**—The Board of Education at this place will receive bids until 8 p.m., May 28, for furnishing 175 tons of anthracite egg coal for immediate delivery to the four schools in the borough. Address District Clk. Thomas F. Rigney, Municipal Bldg., River Rd., Edgewater, N. J.

✚**No. 755—Lakewood, Ohio**—The Board of Education at this place will receive bids until noon, June 8, for furnishing 2000 tons of semibituminous coal to the local schools during the season 1915-16. Bids are requested on either lump or mine-run and are to include the cost of delivery to the various public schools and trimmed as directed. Specifications may be had on application, and bids must be submitted on blanks furnished for that purpose, accompanied by a certified check for $100. The successful bidder will be required to furnish a security bond for $1000. Address Clk. P. T. Harrold, Bd. of Edu., High School Bldg., Warren Rd., Lakewood, Ohio.

Contracts Awarded

✚**No. 367—Dunkirk, N. Y.**—This contract (p. 566), which provides for furnishing the City Water Works with 8000 tons of nut and slack coal, has been awarded to the **Valley Camp Coal Co.** at $1.99 per ton. Address Secy. Baumgartner, Bd. of Water Comrs., Dunkirk, N. Y.

✚**No. 448—Springfield, Mass.**—This contract (pp. 627, 834, 875), which provides for furnishing the Ordnance Department of the Springfield Armory with coal during the fiscal year beginning July 1, has been awarded to the **Maynard Coal Co.,** Springfield, Mass., at $7.25 for anthracite nut and $7 for egg coal. The prices are per short ton. Address Major Ordnance Dept. Samuel Hof, Springfield Armory, Springfield, Mass.

✚**No. 465—St. Louis, Mo.**—This contract (pp. 627, 707, 794, 875), which provides for furnishing the Board of Education with 75,000 tons of bituminous coal, has beeen awarded to the **Polar Wave Ice & Fuel Co.** at $1.91¾ per ton. The bid of the Bald Eagle Mining Co. was the same as the Polar Wave Co., but the latter's superior facilities won it the contract. Address Supply Commissioner, 3431 School St., St. Louis, Mo.

✚**No. 520—Jeffersonville, Ind.**—This contract (pp. 666, 707), which provides for furnishing the Depot Quartermaster's Corps with fuel requirements during the year commencing July 1, has been awarded to the **Taylor Coal Co.,** of Louisville, Ky., at 85c. per short ton, f.o.b. mines for straight mine-run coal. Address Depot Quartermaster Maj. Joseph T. Davidson, Jeffersonville, Ind.

✚**No. 602—Beverly, Mass.**—This contract (p. 795), which provides for furnishing the local City Government with anthracite and bituminous coal, has been awarded as follows: J. J. Harrigan, 750 tons of Lackawanna stove at $7.25 and nut at $7.50 (deliveries on this latter business are to be made in quarter-ton lots as directed). **John Girdler,** 900 tons of egg at $7.15 and broken at $6.90 **Sprague Breed & Brown Co.,** 2500 tons of New River coal at $4.61. Address Clk. of Coms. Frederick B. Browning, Beverly, Mass.

✚**No. 604—Newton, Iowa**—This contract (p. 795), which provides for furnishing the City Electric Light Plant and Water Works with coal during the fiscal year beginning June 1, has been awarded as follows: **The Newton Coal Co.,** $2.48 per ton for mine-run coal delivered in bins at the Electric Plant; **T. J. Kating,** $3.29 per ton for mine-run coal delivered in bins at the Water Works Plant. Address City Clk. C. G. Finch, Newton, Iowa.

✚**No. 605—New York, N. Y.**—This contract (p. 795), which provides for furnishing 650,000 lb. of egg coal for delivery at the city Asphalt Plant, has been awarded to the **Meyer, Denker Sinram Co.,** at $1755. The William Farrell & Sons bid $2.90 per ton or gross of $1885. Burns Bros. bid was $2.97 per ton or $1930.50. Address Pres. of the Borough Marcus Marks, Room 2034, Municipal Bldg., New York.

✚**No. 611—Ada, Minn.**—This contract (p. 795), which provides for furnishing the Local Water & Light Plant with coal during the fiscal year terminating Apr. 1, 1916, has been awarded to a local dealer. The price was $3.30 f.o.b. Duluth, or Superior, for Youghiogheny, screened lump coal. We are advised that the purchasers were unable to obtain any competitive bids on this contract, the five proposals submitted, all quoting the same price. Address Clk. Peter Sharpe, Water & Light Com., Ada, Minn.

✚**No. 631—Milwaukee, Wis.**—This contract (p. 795), which provides for furnishing coal to the Department of Public Works, has been awarded to **Frank Gross, Jr.,** at $2.97½ per ton. Address Deputy Com. of Pub. Wks. Percy Braman, Dept. of Pub. Wks., Milwaukee, Wis.

✚**No. 632—Phillipsburg, N. J.**—This contract (p. 796), which provides for furnishing the local Board of Education with its fuel requirements for the ensuing year, has been awarded on the following basis: Stove, $6.05; chestnut, $6.20; pea, $7.45, all per gross ton. Address Secy. Geo. W. Smith, Board of Education, Phillipsburg, N. J.

✚**No. 633—Hot Springs, S. D.**—This contract (p. 796), which provides for furnishing the National Home for Disabled Volunteer Soldiers with 9000 tons of lignite coal, has been awarded to **Peter Kooi,** Kooi, Wyo., at $3.40 for mine-run coal. This was the only bid received on this contract. Address Treas. and Quartermaster William H. Stanley, N. H. D. V. S., Hot Springs, S. D.

✚**No. 639—Boston, Mass.**—This contract (p. 796), which provides for furnishing the Franklin Union Building with approximately 200 tons of coal has been awarded to **F. C. Warren & Bradford Co.,** at $4.17 per ton, with a guarantee of 14,300 B.t.u. The City Fuel Co. bid $4.24 on a guarantee of 14,400 B.t.u., and the Staples Coal Co. $4.23 on a guarantee of 14,500 B.t.u. Address, Pres. Richard Olney, Franklin Foundation, Berkeley St., Boston, Mass.

Contract Notes

Argentina—Beginning Apr. 1, 1915, the Central Cordoba Ry. will burn wood instead of coal in its locomotives. The road has been importing 80,000 to 100,000 tons of Welsh coal a year at Rosario. The Santa Fé and Government lines already consume considerable quantities of wood fuel and, according to newspaper reports, other companies are considering its use.

Spain—An American consular officer in Spain transmits the names and addresses of a number of leading coal importers and merchants in his district. Correspondence should be conducted in Spanish.

Germany—Germany has notified Sweden that coal will hereafter be regarded as unconditional contraband. Six neutral colliers, it is stated, are now held by the Germans, whose aim is supposedly to stop the exportation of coal to Scandinavia.

New York—The recent announcement that B. Nicoll & Co., of this city, has been appointed exclusive sales agent of the Clinchfield Coal Corporation for the territory in the United States and Canada north of the Ohio River and Hampton Roads, Va., was of much interest to the trade. L. G. Bruder, the Chicago manager of Nicoll & Co. will look after the sales, which will be vigorously pushed.

Buffalo, N. Y.—The bids for supplying 1000 gross tons of mine-run bituminous coal for the Buffalo Post Office were: Marine Coal Corporation, $2.85; Buffalo Fuel Co., $2.88; Spaulding & Spaulding, $2.88; Fairmont Coal Co., $2.90.

Lyon, France—Direct shiploads of anthracite come from time to time from England. Both English and Belgian anthracite are used here in large quantities, and they sell at an average price of from 7 to 8 francs ($1.35 to $1.55) per 100 kilograms (220.46 lb.) in normal times, although the price at present has increased about 25.%

Railroad Coal Cars—On June 30, of last year, there were 899,314 coal cars in the United States having an aggregate capacity of 40,583,490 tons. The average number of freight cars per 1000 mi. of line was 10,121,

Leominster, Mass.—The Hadley Coal Co., at this place, has been awarded the contract to furnish the local public schools with coal during the ensuing year at $7.25 per ton for egg and $7.35 per ton for stove.

Albany, N. Y.—According to press reports, the contract for furnishing the filtration plant and Quackenbush pumping station at this place has been awarded to the **C. M. Stuart Coal Co.,** at $28,780.

Great Britain—The committee of the British Board of Trade which has been investigating the state of the coal trade has recommended as follows: (1) That exports to neutral countries should be restricted. (2) That steps be taken at once to consult with local public bodies regarding the question of accumulating large storage reserves of coal in or near London for use of the small consumers next winter. (3) That freight rates on interned steamers be reduced. (4) That enemy ships condemned by the prize court be taken over by the Government and used for coal transport. (5) That the Government assume control of the output of collieries during the balance of the war, should prices not soon return to a more reasonable level.